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BIRD-BANDING

A Journal of Ornithological Investigation

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Vol. XXVI October, 1955 No. 4

PUBLISHED FOR
THE NORTHEASTERN BIRD-BANDING ASSOCIATION
THE EASTERN BIRD-BANDING ASSOCIATION
AND
THE INLAND BIRD-BANDING ASSOCIATION

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BIRD-BANDING

A JOURNAL OF ORNITHOLOGICAL INVESTIGATION

VOL. XXVI OCTOBER, 1955 No. 4

BREEDING OF THE SEMIPALMATED PLOVER ON BAFFIN ISLAND

BY GEORGE M. SUTTON AND DAVID F. PARMELEE

Taverner (1934:121) calls the Semipalmated Plover *(Charadrius semipalmatus)* the "most conspicuous and common plover" of eastern arctic America. Soper (1928:102) calls it "the common plover of Baffin Island." In the summer of 1953, at the head of Frobisher Bay in southeastern Baffin Island, we found it not only the commonest plover but also the commonest shorebird. It was, however, exceedingly local. In most of the 18-square-mile area covered regularly by us we never saw or heard it at all.

Our headquarters were at Lat. 63° 45′ N., Long. 68° 33′ W., at a Royal Canadian Air Force Base. Here the Semipalmated Plover was a familiar dooryard bird. We saw it whenever we stepped outdoors, day or night, notably an individual which often perched on the roof of a low building near ours, or on a big brown tent close by. At least twelve pairs nested in low country north of the Base. Three more pairs nested just above the high-tide mark near the Base's dump. Scattered pairs nested on the Davidson Point lowlands and along the east bank of the Sylvia Grinnell River about a mile from its mouth. In the rough land between the Base and the Hudson's Bay Company post, about a mile to the east, we virtually never saw the bird. Just east of the post, in a low part of the peninsula enclosing Tarr Inlet on the west, a few pairs bred. The shores of the Inlet were too steep for the species, and the meadows to the east too marshy, but we saw and heard plovers occasionally on the Inlet itself when the tide was out. Along an unnamed river two or three miles east of Tarr Inlet at least two pairs nested. Five or six miles up the "HBC River" (our name for the stream which emptied into the sea near the Hudson's Bay Company post), six or more pairs nested in a close-knit group. This "colony" we visited once, July 26.

The species showed a marked preference for level, well-drained, gravelly places as a nesting-ground (cf. Taverner and Sutton, 1934:33). Nowhere was it a "grass tundra" bird (see Soper, 1940:14). Feeding grounds included tidal flats if these were near the nesting-ground, but favored feeding-places were shallow streams, or mud-bars in tundra ponds. Pairs which nested just north of the Base stayed there all the time. Those which fed on the tidal flats nested between the high-tide mark and the dump, or on Davidson Point. Nowhere did we find "solitary breeding pairs" such as those reported from Bowman Bay by Soper (1946:226). Rather did we find several pairs "in one neighborhood"—as had Hantzsch (1929:11) on the Labrador.

The only bird sharing the plover's breeding-ground at the Base was the Horned Lark *(Eremophila alpestris)*. The Snow Bunting *(Plectrophenax nivalis)*, Lapland Longspur *(Calcarius lapponicus)*, and Water-Pipit *(Anthus spinoletta)* were common in the vicinity, but they did not nest on the gravel flats—they merely fed there occasionally.

Near the mouth of the Jordan River, 16 miles west of the Base, we found about 15 pairs of plovers in a two-mile stretch of the west bank, all of them, again, in flat, gravelly places. Here a noisy group (three or four pairs) accompanied us almost constantly as we walked up-river. As one pair, whose nesting area we had just traversed, dropped out, another pair joined in the chorus of complaint. So attached to the gravelly areas were they that we saw them nowhere else.

By courtesy of the Royal Canadian Air Force we flew to three areas far removed from Frobisher Bay—an unnamed lake (Lat. 68° 31′ N., Long. 71° 22′ W.) about 50 miles east-northeast of Wordie Bay, on August 8; the southeast corner of Lake Amadjuak (Lat. 64° 38′ N., Long. 70° 28′ W.) on August 8 and 15; and a lake (Lat. 65° 20′ N., Long. 77° 10′ W.) near Cape Dorchester, August 11. At none of these places did we see or hear a Semipalmated Plover despite there being, in all three areas, gravel flats which looked like those the species frequented near the Base.

Greatly disappointed were we not to find the Ringed Plover *(Charadrius hiaticula)*. All the specimens we collected were *semipalmatus*, and we feel quite sure that every bird we saw was of that form.

When we started work June 15 we were instantly aware of being late for certain stages in the reproductive cycle of most of the birds. The flat about the Base was bare, but the surrounding slopes were half white with snow, and the bay was covered with ice. Of Horned Larks we saw only males that first day; the females were, we deduced, on their nests. The many pairs of Snow Buntings surprised us: we were to learn that nests had been finished and some eggs laid, but the clutches were not complete and the females were not yet incubating (Sutton and Parmelee, 1953:160). Longspurs and pipits were everywhere, the former conspicuous because of their flight-songs. The Semipalmated Plovers were excited and noisy, but there seemed to be no way of telling in which areas they were nesting.

The plover's common callnote, *tee-wick* or *ke-ruck*, we heard almost constantly on the flats. If we climbed the hills, the calling subsided behind us: the flats, not the slopes, were the nesting-ground. The plovers were handsome little birds. The white spot back of and above the eye looked small (see Wynne-Edwards, 1952:368), and the black chest-band was narrower in the middle than at the sides. We observed only two flight-songs on June 15. These were speeded-up repetitions of the *ke-ruck* cry, followed by a rough *r-r-r-r-r-r-r-r-r*, and ended with a slurred, descending yelp or crow.

Not far from a longspur nest we had found just north of the Base, we saw a plover slipping along the ground with head and fanned-out tail held low. Later in the day (June 15) we returned, again saw a plover running off, and found the nest (Nest 1) without difficulty. It held two eggs. These we marked, each with a red dot. The nest was a

FIG. 1. Semipalmated Plover Nest 1. Near head of Frobisher Bay, Baffin Island, June 26, 1953.

neat, circular cup in the gravel. It was scantily lined with bits of white lichen, short sections of grass-stem, and tiny dry leaves, and was not sheltered in the least by a rock or tuft of grass. It was near the edge of a broad gravelly area and forty paces from a little stream. The longspur nest was thirty paces to the north, in a turfy spot. The plovers paid no attention to the longspurs, and *vice versa*.

The third egg was laid in Nest 1 between 4:45 p.m., June 15, and 6:08 a.m., June 16. At 7:50 p.m., June 16, there still were only three eggs. Determined to learn as exactly as possible when the fourth egg was laid, we visited the nest hourly during the following ten hours. *At each visit* we flushed a bird from the three eggs. At 10:20 a.m., June 17, there were still three eggs. The fourth egg was laid between 10:20 a.m. and 2:50 p.m., June 17.

We visited Nest 1 daily but spent very little time there; we did not mark the parent birds; and we never watched one bird relieve the other in incubation. Whenever we went to the nest, both birds seemed to be be there, one on the eggs, the other close by. When, as we approached, the two birds started calling, they were promptly joined by two to four other plovers. On July 17 and 18 the parent birds started calling when we were about 60 paces away. Later it seemed to us that one bird (or both) started calling the instant we stepped out of our quarters and headed in the direction of the nest.

On June 18, about two hundred yards west of Nest 1, we hid behind a pile of gravel and watched several plovers. They seemed to be in twos, and they were running and flying about us in all directions. Presently they quieted down and all but two withdrew. These two ran side by side to a spot not far from us, one promptly squatted, and the other leaned forward with flank feathers puffed out, head down, and tail spread wide and lifted. Assuming that the birds were at their nest, we ran forward, finding only a scrape. We hid again. The two birds ran to another spot, then to another, going through the same performance. Neither of these additional "nests" turned out to contain eggs; they were fairly deep, unlined cups in the gravel, each about 15 paces from the other two. We later found a true nest only a few rods from the three scrapes. These scrapes retained their shape surprisingly well all summer long.

On June 19 we walked several miles up the Sylvia Grinnell River. Nowhere did we see the Semipalmated Plover except along a gravelly stretch about a mile in from the mouth. From June 20 to 26 we saw the species frequently; occasionally saw a bird scuttling off with tail spread wide and depressed, and head down; visited Nest 1 daily; but found no more nests. At Nest 1 we spent about an hour on June 26. Most of that time three birds were near us, calling loudly; but only one of them went so far as to lie on its side with mouth open as if gasping, tail fanned out, and one wing lifted and waving.

June 27, on Davidson Point, we collected our first specimens—two males. In these the testes were somewhat enlarged (7 x 4 and 5.5 x 3 mm. in GMS 11729; each 7.5 x 4 in GMS 11730), but neither had brood-patches. The eyes were dark brown; the eyelids lemon yellow; the bill orange throughout the basal half and black at the tip; the legs and feet brownish yellow. The legs of the living birds had looked orange to us, so the color probably faded immediately after death. The web between the middle and outer toes was distinct.

On June 30, near the dump, we found Nest 2. It held four eggs and was only a rod or so from, and two feet above, high-tide mark. It was in a sloping, twenty-foot-wide, pebbly zone bordering the turfy crown of a low peninsula (island when the tide was exceptionally high). It was not sheltered by any sort of rock or vegetation, but the whole area was protected from the wind by higher land. It was the only nest we found that was not on a gravel flat.

July 1 was our latest date for a plover flight-song. That day we found Nest 3. This was a quarter of a mile north of Nest 2 and not quite that far west of Nest 1. It was on a gravelly flat and was wholly unsheltered by a rock or tuft of grass. It held four eggs.

From July 1 to 5 we visited Nest 1 at least twice daily. Never did we go there without being attended by three or four birds. Where the extra birds came from we did not know. On July 5 one of the parent birds was especially demonstrative: it called loudly, flew close, and dragged itself on the ground with head low, tail spread and pressed down, and wings "shuffling" and waving. Tucker's description of the "injury feigning" of *C. hiaticula* (1948. *Handbook of British Birds*, Fifth Impression, Vol. IV, p. 349) seems to describe quite well what we observed. We did not, however, note any such constant repetition

of a "definite series of actions . . . each time in the same order" as Mitchell (1935: 61) has reported for that species.

On July 5 we found Nest 4. In finding it we tried a new procedure. Knowing, from long association with the birds, that three pairs were nesting not very far west of Nest 1, we partly concealed ourselves, allowed the six birds to gather about us, then, instead of watching the closest, trained our glasses on the farthest and least obvious. This method worked. Presently only five birds were visible near us, then four. Scanning the tundra beyond these, we saw a distant bird, with back toward us, moving off at a slow run. Within 30 seconds it was at its nest. The instant we rose it ran off swiftly, neither dragging itself along the ground nor flying in close with loud calls. The nest held four eggs. It was only a few rods from the three scrapes mentioned above, and 33 paces from a Lapland Longspur nest at the edge of a marshy area. The two nest-sites were radically different, that of the longspur being grassy and wet, that of the plover gravelly and dry.

On July 7 we found Nest 5 (four eggs). It was 136 paces northwest of Nest 3. We found it through seeing one of the parent birds scuttling along the ground with tail spread wide and pressed down. While we were near the nest, four plovers surrounded us, all calling.

On July 9, at 4:45 p.m., we could hear peeping inside one of the eggs at Nest 1. The egg bore three of our red dots, so it was one of the first two laid. The parent birds were wild with excitement, and four other adults joined the chorus of complaint and protest. On July 10 we visited Nest 1 several times. At each visit we heard peeping inside all four eggs. Although we examined the eggs with care we could not find a hole in any of them. At Nest 4 (the nearest of the other nests) we listened to the eggs, but heard no peeping. Very early the following morning (12:30 a.m., July 11), we found a neat little hole in each egg of Nest 1. The peeping of the four unhatched chicks seemed to be about equally strong. Five hours later (5:30 a.m.) we found all the chicks hatched. They had not emerged simultaneously, for one was not quite dry. They stayed in the nest-cup, making no attempt to run off when we touched them. Nearly two days had passed since we had first heard peeping in one of the eggs, but the actual hatching had, of course, not taken that much time. Jourdain (in Bent, 1929: 231) says that young Ringed Plovers "are hatched within 24 hours." Nowhere in the vicinity did we find a bit of eggshell. The period between the laying of the last egg and the hatching of the four chicks at this nest had been at least 23 days, 9 hours, and 40 minutes; at most 23 days, 19 hours, and 10 minutes. Sutton (1932: 107) reported an incubation period of 23 days from Southampton Island.

On July 12 we went to Nest 1 early, finding it empty. Seating ourselves, we watched the parents, both of whom were greatly excited. One of them soon went to a chick about ten feet from the nest and brooded it. As we picked up that chick we noticed another, a foot or so away. Holding the two chicks, which stopped peeping when covered with the hand, we backed off and resumed our watching. The more bold and clamorous of the parents was also the more intent upon brooding the young. The third chick was much farther from the nest than the first two had been. After we had captured this one the focus

of interest shifted again, this time to a spot fully 30 feet from the nest. The parent plover finally ran to this chick and settled, calling loudly as it brooded. The last chick was noticeably the most vigorous of the four; it struggled more than the others had and continued to peep even when covered by the hand. We color-banded the brood (red-on-right) and let them go. The webbing between the middle and outer toes was distinct.

At Nest 2, late that afternoon, we found a tiny hole in one of the eggs: hatching had started. Only two adult plovers attended us there. On the flats north of the Base, while we were making the round of the other nests, three to five adults flew or ran about us constantly. At Nests 3, 4, and 5 we heard no peeping inside any of the eggs.

On July 13 we journeyed to the mouth of the Jordan River. V. C. Wynne-Edwards, also of the party, saw a few plovers on flats near the river mouth.

On July 15 we visited Nests 3, 4, and 5. At none of the nests did we hear peeping inside the eggs.

On July 16, at about 8 a.m., we visited Nest 2, fully expecting to find the chicks hatched and gone. We were amazed to find three dry chicks and an unhatched egg. There was a hole in the egg, and we could hear peeping inside. We color-banded the three young (red-on-left). Hatching of this brood already had required four days. Obviously there was great variation in the time required for hatching—or, and this seemed a pertinent question, precisely when did hatching begin?

On July 17, at 6 a.m., we found two banded and one unbanded young in Nest 2. The third banded chick we failed to find. The unbanded chick, a male (GMS 11763; testes distinct), we preserved as a skin. The tarsi and tops of the toes were dull bluish gray, the soles pale brownish yellow; the bill dark bluish gray, without a hint of yellow or orange at the base; the eyelids gray; the irides dark grayish brown.

On July 18, 19, and 20, along the west side of the Jordan River, we encountered several pairs of plovers, all in well-drained, comparatively grassless areas. No bird of the 30-some we saw was *hiaticula*. We found neither eggs nor young birds, though adults "feigned injury" repeatedly as we crossed or skirted gravelly areas.

On July 21, early in the morning, we visited Nest 3, finding three dry chicks and a pipped egg. The chicks we color-banded (green-on-right). The unhatched chick was peeping inside the egg. At Nest 4 at least one of the eggs was pipped, and the chick was peeping inside. Nest 5 was empty.

On July 23 we visited Nest 4. The bird which left the eggs demonstrated violently. Within a radius of forty to sixty yards the clamor and activity were almost beyond belief. Wherever we looked we saw plovers — two or three of them standing quietly, breasts toward us; others running about calling noisily; others flying. The flying birds crossed and recrossed, often in well-defined flocks. All this we interpreted as a mixing of the local breeding population—a mixing concomitant with hatching of the young and cessation of nest-territory

defense. Many of the young were now at large. Where broods were feeding in a circumscribed area not far from the empty nest, the parent birds continued their defense of that area—but the defense was of the young, not of the nest.

We visited Nest 4 on July 25, finding it empty. In vain we hunted for the chicks. Nine adults continued to fly or run about us, calling incessantly. On our way to the Sylvia Grinnell River we crossed a broad gravel flat not far from the landing-strip. Here, in the midst of several agitated adult plovers, we spied a well developed chick running toward a big rock. How the bird got away from us we shall never know, but we never saw it again. Returning from the river, a few hours later, we crossed a small stream near the hangar. Here the complaints of several adult plovers informed us that there were young in the vicinity. Presently we saw two chicks running through the shallow water. We caught them both; neither was banded. We preserved one of them, a female (GMS 11790), as a skin.

On July 26, about six miles northeast of the Base, at a confluence of several tributaries to the HBC River and at an elevation of at least 500 feet, we came upon a close-knit population of six or seven pairs of Semipalmated Plovers which must have been nesting on gravel flats there. This "colony" was farther from the sea than any other observed by us all summer.

We made an important capture on July 28: A "red-on-right" chick from Nest 1. We had noticed, day after day, that plovers continued to call from the vicinity of that nest. As we were walking along the edge of a wettish spot in that area, an adult plover flew directly in front of us, alighted in a crouching attitude with tail spread wide, and moved forward almost as if pushing itself along. As we looked about, fully aware that this behavior indicated the proximity of eggs or young, we saw a half-grown chick, then another, running through shallow water about 15 yards away. With the glass we could see the red leg-bands clearly. We caught one of the chicks, finding to our surprise that it was still quite downy. Its remiges were about a third grown. We took a photograph showing the spread wing and color-band, and let the bird go. It was 17 days old. The spot at which we had caught the chick was 21 paces from the nest (see Fig. 2).

On July 31 we collected a brightly colored adult male (GMS 11797; testes 4 x 1 and 2.5 x 1 mm.; well-defined brood-patches), one of three birds which seemed much attached to a cluster of small, shallow pools in a gravelly spot on Davidson Point. For a time we thought that this bird had two mates, for it was decidedly the brightest of the three in foot- and bill-color, and it displayed with considerable ardor before the other two birds. The display consisted of a bowing forward; a lifting, fanning, and tilting of the tail; and a puffing out of the side and flank feathers. After we had collected this bird, one of its companions disappeared completely and the other became decidedly less vociferous. The remaining bird eventually stopped calling, made its way to the top of a pile of gravel, and stood there silent. We kept this bird in sight long after leaving the area, looking back at it through

FIG. 2. Semipalmated Plover chick 17 days old. Near head of Frobisher Bay, Baffin Island. July 28, 1953.

our glasses. When we returned early the following morning, a dull-colored plover was standing in exactly the same spot.

On August 2, from 10:30 to 11:30 a.m., we observed two of the "red-on-right" Nest 1 chicks and one parent bird. Our recent capture of one of this brood had brought to our attention the interesting fact that the chicks had not made their way to the ocean-shore. Seating ourselves at a window in a small building not far from Nest 1, we soon saw an adult plover, then one chick, then another, near the spot at which we had caught the young bird five days before. The 22-days-old chicks were much more mature-looking than they had been on July 28, but they were still somewhat downy. Their wing-tips stuck out, giving their tail-end a jagged effect. The white of the collar was noticeable, sticking up like a nuchal patch or crest. The dark chest-band was indistinct. The chicks kept their heads drawn in close against their shoulders. In feeding they progressed in stiff runs of 12 to 16 steps, each run terminated with a jab at the gravel. The jabs looked futile, for the pauses between runs were hardly long enough for the actual sighting of food. Neither chick spread its wings or attempted flight. The parent bird made not the slightest effort to find or obtain food, but stood quietly to one side. We saw nothing of the other parent or the other two chicks.

Gradually the three birds moved away from us. The chicks, now widely separated and no longer feeding, were running across wide stretches of tundra. Presently they climbed the great rounded rocks at the base of the foothill. The agitation of the parent bird seemed unwarranted, since the chicks were now far from us.

Suddenly, with an outburst more shrill than any we had heard all morning, the parent plover flew swiftly up the foothill toward an advancing Raven *(Corvus corax)*. Here was a possible explanation of the parental anxiety: the Raven may well have been in sight for some time. The great bird came straight on, alighting on the very rock across which one of the chicks had recently run. Here it walked about, eyeing the crevices. Determined to see exactly what happened in case the Raven found a chick, we raised the window for a clearer view—and off went the Raven, followed by the screaming plover.

On August 4 we visited an unnamed river some miles east of Tarr Inlet—a stream memorable because of the spectacular ox-bow near its mouth. While walking just above this ox-bow, we saw a plover chick running ahead of us. The rear part of the chick's tarsi and the bottoms of its toes were dull yellow. Captured, the chick emitted a sharp *ke-ruck*, very like the cry of the adult. Its bill was quite large. Its remiges were fairly well developed, but far too pinfeathery for flight. Tufts of black down clung to the tips of the tail feathers. The manus (wrist to tips of longest primaries) was about two inches long. The head was largely downy; but the back feathers, scapulars, lesser coverts, and feathers of the under parts were mature-looking, being free of downy tips.

On August 10, near the Base, we saw a plover running ahead of us in a muddy road. At first we thought this bird was adult, for it was good-sized; but as we drew closer, it spread its wings wide, displaying stubby remiges not nearly long enough for flight. Its cries were precisely like those of an adult. It made no attempt to fly, but continued to run with outspread wings as long as we chased it. The tarsi and toes were dull brownish orange, the bill dusky, the eyelids gray. Clinging to the tips of the partly grown rectrices were black neossoptiles. This specimen we preserved (male, GMS 11825).

The following day (August 11) we collected a "red-on-right" plover (male, GMS 11826) near Nest 1. This bird had been banded, when one day old, on July 12, and was therefore 31 days old. It was one of a group of six plovers, two unbanded adults and four young (three "red-on-right"; one unbanded), all of which were flying well. Two of this brood, when last seen on August 2, had been wholly incapable of flight. The fledging period had, then, been more than 22 days and less than 31 days.

The specimen collected was very downy on the chin and throat; indeed, wisps of down clung to feathers all over the head. The rectrices had no down at their tips, however. The dark feathers of the upper part of the body were edged with dull reddish-brown, giving a somewhat scaled effect. The remiges, though well developed, were still sheathed at the base.

Between August 11 and 22 we recorded the Semipalmated Plover repeatedly; we did not, however, see any color-banded birds. We en-

countered many groups of plovers on the tidal flats and noticed that the nesting areas were gradually being deserted. Four of six birds which we saw on the tidal flats near the Hudson's Bay Company post on August 18 were so young that we could see traces of down on their chins and throats. The other two birds were obviously adult. In another group of shorebirds seen that day were six or seven young Semipalmated Plovers and one Semipalmated Sandpiper *(Ereunetes pusillus)*.

DESCRIPTION OF SPECIMENS

The three adults collected were all males. Neither of the two taken June 27 had brood-patches, so we were not sure that they had mates or nests, but they acted as if they were defending nest-territories. Measurements (in millimeters) of these males, all taken on Davidson Point, are as follows:

GMS No.	Date	Wing	Tail	Culmen	Tarsus
11729	June 27, 1953	122	59	13	23.5
11730	June 27, 1953	117	58	14	23.5
11797	July 31, 1953	122	58.5	14	24.5

In the above specimens the web between the middle and outer toes is well developed. The presence of this one character obliges us to call our birds *semipalmatus*, whether we consider the form conspecific with *hiaticula* or not.

ACKNOWLEDGEMENTS

These studies were aided by a contract between the office of Naval Research, Department of the Navy and the Arctic Institute of North America N7onr-367-01.

We are grateful to Messrs. Ross Peyton and Brandon Halloran of the Hudson's Bay Company, to Constables Robert Van Norman and Robert Pilot of the Royal Canadian Mounted Police, and to personnel of the Royal Canadian Air Force, for helping us to reach remote parts of Baffin Island. Especially grateful are we to Dr. V. C. Wynne-Edwards, of Aberdeen University, for his careful confirmation of our field identifications of *C. semipalmatus*. This ornithologist's wide experience with both *hiaticula* and *semipalmatus* gave special validity to his opinions concerning the ways in which the two forms can be distinguished in life.

SUMMARY

1. The Semipalmated Plover bred in some numbers, but locally, in flat gravelly areas near the head of Frobisher Bay, southern Baffin Island, in the summer of 1953. Of five nests found by us, four were in flat low land well back from the sea, while one was on a pebbly slope just above high-tide mark. Birds which nested away from the sea did not visit the tidal flats much, if at all, during the nesting season.

2. Each of the five nests found by us held four eggs. We believe that all 20 eggs hatched; eleven of them certainly did. We obtained no evidence that any egg of the 20 was destroyed by a predator.

3. At Nest 1 the third egg was laid between 4:45 p.m. on June 15 and 6:08 a.m. on June 16; the fourth egg between 10:20 a.m. and 2:50 p.m. on June 17. We flushed a bird from the two or three eggs repeatedly on June 15, 16, and 17, so these received some incubation while the clutch was incomplete.

4. The chick in one of the first two eggs laid in Nest 1 was cheeping at 4:45 p.m., July 9. The four chicks emerged between 12:30 (at which time there was a small hole in each egg) and 5:30 a.m., July 11. The period between the laying of the last egg and the hatching of the brood was at least 23 days, 9 hours, and 40 minutes; at most 23 days, 19 hours, and 10 minutes.

5. The chicks at Nest 2 began hatching on July 12 (in the late afternoon one egg had a hole in it); and one chick was still hatching at 8 a.m., July 16. Hatching of that brood extended, therefore, over at least a four-day period.

6. A Nest 1 chick, color-banded when less than one day old on July 12, was still somewhat downy and unable to fly on July 28, though its flight-feathers were about half-developed. Nest 1 chicks were still unable to fly on August 2, when 22 days old, but they could fly well on August 11, when 31 days old. The fledging period was, therefore, between 22 and 31 days.

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THE PEREGRINE FALCON ON BAFFIN ISLAND

BY GEORGE M. SUTTON AND DAVID F. PARMELEE

In the summer of 1953 at least three pairs of Peregrine Falcons *(Falco peregrinus)* nested about the head of Frobisher Bay, southeastern Baffin Island—one pair on a low cliff near the mouth of the Sylvia Grinnell River, just west of the Royal Canadian Air Force Base at which we had our headquarters (Lat. 63° 45′ N., Long. 68° 33′ W.); another on the bold eastern front of Silliman's Fossil Mount, near the mouth of the Jordan River, 16 miles west of the Base; and a third on a high, bluff island (not named on maps at hand), across the bay about 15 miles south of the Base. We did not see the species at Lat. 68° 31′,

N., Long. 71° 22′ W., about a large lake 50 miles east-northeast of Wordie Bay, August 8; at Lat. 65° 20′ N., Long. 77° 10′ W., near Cape Dorchester, August 11; of at Lat. 64° 38′ N., Long. 70° 28′ W., along the southeast shore of Lake Amadjuak, August 8 and 15. At these places there were no cliffs, so our failure to find the bird did not surprise us. In general the Peregrine and Rough-legged Hawk *(Buteo lagopus)* occupied about the same areas. The Rough-leg did not, however, nest on Silliman's Fossil Mount or the high island across the bay south of the Base; and the Peregrine did not, so far as we know, nest anywhere about Tarr Inlet, a region inhabited by two pairs of Rough-legs.

According to Wynne-Edwards (1952:366) the most northerly breeding station for the Peregrine on Baffin Island is at the head of Gibbs Fjord (Lat. 70° 37′ N., Long. 72° 30′ W.), along the east coast. Here a pair observed between June 27 and July 12, 1950 "appeared to be nesting low down on a high cliff, about one-half mile from the water." Another nest reported by Wynne-Edwards *(loc. cit.)* for that same season was in a rocky gully at the west end of Kranck Lake, near the head of Clyde Inlet. Soper (1928:107) discusses a nest with "three half-grown young in the downy stage" found August 10, 1925, at Amittok Lake, near the head of Nettilling Fjord; refers to Hantzsch's breeding record (June 17, 1910) for the same place; and informs us that the MacMillan expedition to southwest Baffin Island, 1921-22, obtained "eggs and skins." More recently Soper (1946:224) has called attention to the rarity of the Peregrine in Foxe Peninsula, where he observed adults of the species only three times "during the entire expedition of 1928-1929." He does mention, however, "three well-fledged young on a cliff at Schooner Harbour," a locality presumably near the "Peregrine Point" of his sketch map (1946:10). Kumlien (1879:82), who considered the Peregrine a "regular breeder" in Cumberland Sound, mentioned "nearly full-fledged young . . . taken from the nest on a high cliff in the Greater Kingwah Fjord" in August.

We suspect that *Falco peregrinus* nests northward along the whole east coast of Baffin Island and also on Bylot, Devon and Ellesmere Islands. Salomonsen (1950:443) informs us that it breeds in the vicinity of Thule, Greenland. Shortt and Peters (1942:342-3) report its breeding at Fort Ross, Somerset Island. According to Taverner (1934:119), the northern limits of breeding in eastern arctic America are the Cumberland and Boothia peninsulas.

In 1953 we first recorded the Peregrine on June 18. That day we walked to the mouth of the Sylvia Grinnell River and upstream a mile or so. Walking on hard-packed, water-gouged snow along the bank, we scrutinized the slopes ahead of us, wondering whether any of them could be steep enough for Peregrines or Gyrfalcons *(Falco rusticolus)*, the latter a species we hoped very much to find. Using our glasses, we saw scattered white splashings on the rocks. All at once a male Peregrine flew out, squealing in a shrill voice. It did not dive at us; instead, flying up over the cliff, it alighted on a high rock. With a roundabout approach, we collected this bird (GMS 11707). As we shot, the female flew out below us. Her voice was deeper than her mate's and she flew close, as if to attack. After shooting her (GMS 11708) we

FIG. 1. Nesting cliff of Peregrine Falcon near the mouth of the Sylvia Grinnell River, Frobisher Bay, Baffin Island. The nest-site was near the dark spot in upper-left. Photographed August 17, 1953.

clambered about the rocks a long time before locating the nest, a depression in dry, sandy earth in a sheltered niche. The three eggs lay, not side by side, touching, but some distance apart from each other.

Both Peregrine specimens were fully adult and in excellent feather. The stomach of the male contained remains of a Red Phalarope *(Phalaropus fulicarius)*, a species then migrating through the area in some numbers. The crop and stomach of the female were packed with the remains of five adult lemmings—four *Dicrostonyx groenlandicus* and one *Lemmus trimucronatus*. At the foot of the cliff we found feathers of several Snow Buntings *(Plectrophenax nivalis)*, of at least one Red Phalarope, and of one White-rumped Sandpiper *(Erolia fuscicollis)*. Two of the three falcon eggs were fresh; in the third there was a small embryo.

About a mile northeast of this eyrie, on a cliff above a small stream, a pair of Rough-legged Hawks were nesting. While we were at this cliff on June 21, a large falcon flew over us. We thought it was a Gyrfalcon, but it may have been a female Peregrine. The Rough-legs did not attack it. Their attitude toward Snowy Owls *(Nyctea scandiaca)* was different. When an owl flew up or down the valley near their nest they dived at it fiercely.

Near the Hudson's Bay Company post, about a mile east of the Base, bluff land fronted the sea. On June 22, while we were climbing about the rocks there, two Peregrines engaged in playful maneuvers above us. The birds appeared to be small and of the same size, so they were prob-

ably both males. As they circled, chasing each other, they cackled and squealed. Occasionally they met head-on, reached their feet out toward each other, and fell through the air, catching themselves while still well above the rocks.

On June 28, while we were making observations at the nest of a Wheatear *(Oenanthe oenanthe)*, a Peregrine flew in low over the rocks. The Wheatears, which had been much in evidence, hid promptly. They were nowhere to be seen or heard while the predator was in the vicinity (see Sutton and Parmelee, 1954:299).

July 13 V. C. Wynne-Edwards found a Peregrine eyrie along the front of Silliman's Fossil Mount, near the mouth of the Jordan River. The nest was in a high crevice among the crumbling limestone. Below it on the talus were remains of Snow Buntings and lemmings. Brandon Halloran shot the male falcon (GMS 11754) for us. The stomach contained parts of a Snow Bunting. We did not visit this eyrie ourselves until some days later.

July 14 Dr. Wynne-Edwards saw a Peregrine about half way between the Base and the Hudson's Bay Company post.

July 17, while we were in the gorgelike channel between Bishop and Hill Islands, a Peregrine flew in high from the west. We were close to a Rough-leg eyrie and the Rough-legs were screaming at us. The Peregrine did not cackle or dive at us, and it seemed to pay no attention to the Rough-legs.

July 18, while we were searching for young Snowy Owls on the top of Silliman's Fossil Mount, we saw a Peregrine pounce fiercely three times on an adult owl which had alighted near the falcon's eyrie. When the falcon stooped the fourth time, the owl flew upward to meet it, throwing its feet out clumsily while upside down midair. The owl's nest was on the very top of the Mount, but the young owls, still unable to fly, had scattered widely. The young Peregrines were fledging. We saw two of them flying about that day. On July 19 we saw the adult Peregrine go with food to the nest-niche while the two young followed it, so another eyas might still have been in the nest. We saw only one adult bird there on July 18 and 19.

On July 29, the latest date on which we recorded the Peregrine, we found a pair on a high island across the bay about 15 miles south of the Base. The birds dived at us repeatedly, especially the large, deep-voiced female. We failed to find the nest, though we saw a big patch of white-washing two hundred feet up on a cliff. Along a narrow band of wet shore below there were scattered Snow Bunting remains.

DESCRIPTION OF SPECIMENS

Our three specimens we sent to the U. S. National Museum for subspecific identification. Dr. Herbert Friedmann reports on them as follows (letter of March 10, 1955): "I make them out to be the North American race *anatum*, and find no evidence in them that suggests the so-called buff colored small duck hawks supposedly coming from the arctic or sub-arctic tundra.

"I may say that the North American race *anatum* is at best a very poor one. There is no constant difference in either size or coloration between it and the typical subspecies of Europe. On the whole, there is a slightly greater size evident in North American birds, but the difference is small enough and inconstant enough to make it difficult to identify individual specimens. Pending the time when someone with really comprehensive material of both North American and Eurasian birds shall make a careful . . . study of the whole problem, I prefer to go along with current usage and call the North American birds *anatum*."

The three specimens measure as follows (in millimeters):

GMS No.	Sex	Wing	Tail	Culmen	Tarsus
11707	Male	306	142	19.0	50.0
11754	Male	310	143	15.5 (much worn)	47.0
11708	Female	362	175	24.0	56.0

The three eggs measure as follows (in millimeters): 53.0 x 42.5, 52.5 x 40.0, 50.0 x 39.5.

REPRODUCTIVE SUCCESS AND SPECIES SURVIVAL

The three nestings discussed above were more or less successful. The river-mouth pair near the airfield were successful to the point of laying a full clutch of three eggs. At the Silliman's Fossil Mount eyrie at least two young fledged about July 18 despite the death of the male parent July 13. The island pair across the bay from the airfield probably had young on July 29, the date of our only visit to that area. Along the channel between Bishop and Hill Islands a pair almost certainly nested, but we did not discover the eyrie. Peregrines which we saw after June 18 in the vicinity of the airfield may or may not have been breeding.

Nowhere about the head of Frobisher Bay were alcids or shorebirds common enough to furnish the Peregrines a ready food-supply all summer. Snow Bunting remains at three eyries and in one Peregrine's stomach were evidence that the bunting was preyed upon. Phalarope and sandpiper remains at an eyrie in mid-June were evidence that shorebirds were captured while migrating through the region. At two eyries we found lemming remains. The stomach and crop of a female Peregrine collected June 18 were packed with lemmings. Below the island eyrie across the bay from the airfield we found bunting remains but no lemming remains. The Snowy Owls and Rough-legged Hawks nesting about the head of the bay preyed exclusively, so far as we could tell, on lemmings. Nowhere about the head of the bay was either the Weasel *(Mustela erminea)* or Arctic Fox *(Alopex lagopus)* at all common.

Nowhere did we find Peregrines sharing a cliff with Rough-legged Hawks or Ravens *(Corvus corax)*. The river-mouth eyrie near the airfield was fully a mile from the nearest Rough-leg eyrie.

ACKNOWLEDGEMENTS

These studies were aided by a contract between the Office of Naval Research, Department of the Navy and the Arctic Institute of North America N7onr-367-01. We wish to thank Dr. V. C. Wynne-Edwards, of Aberdeen University, Messrs. Ross Peyton and Brandon Halloran, of the Hudson's Bay Company, and Constables Robert Van Norman

and Robert Pilot, of the Royal Canadian Mounted Police, for valued assistance afield.

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EXPERIMENTS WITH THE ALL-PURPOSE TRAP

BY JOHN V. DENNIS

With a view to finding out more about the factors which limit or increase trap take, the writer during part of November and December, 1953, and January 1954, conducted a number of experiments with the All-Purpose Trap (described by Seth Low, *Bander's Manuel* IX: 10-11, 1953). Six traps were built for the study. Each was constructed according to specifications but certain refinements, such as concrete floors and drip pool, were not included. The traps were not identical in every detail as some differences, such as in degree of curvature and size of entrances, proved unavoidable.

As originally planned the study was to include comparative tests on baits, water-drip versus grain, and trap take in relation to habitat and to weather and time of day. The traps were placed in pairs, each unit in a pair approximately equivalent so far as location and habitat was concerned. None of the tests required banding of birds, but all birds taken in the traps were examined and given bands, if none were present. Banding was not a necessary part of the study, but a desirable part since the writer wanted to simulate as nearly as possible actual conditions at a banding station. Traps remained in the same position from day to day except when a new phase of the study required removal. Food was constantly maintained in the traps, and, when not in use for experimentation, a section of the top was opened so as to allow birds free entrance and exit. Prior to the study period, except for some experimental runs, no banding or artificial feeding had been carried on in the trapping area. But for many years birds had been in the habit of coming to the area for an abundant supply of weed seeds and such attractions as the ripening heads of the common sunflower.

Considered in this report are preliminary findings in respect to habitat, baits, weather and time of day. Owing to wet weather no tests

were conducted on the water-drip versus grain. And owing to the impossibility of visiting the traps at regular intervals only some broad comparisons have been made in regard to trap take in relation to time of day. Experiments were confined to the period November 23, 1953 through January 13, 1954.

STUDY AREA

The study area was located on a farm two miles south of Leesburg, Virginia and adjacent to a heavily wooded region bordering the Potomac River. Trapping activity was to center about an acre garden plot and a small section of nearby woodland. Within and adjacent to the garden were several small apple trees. Otherwise the land had been used for the growing of vegetables and sudan grass *(sorghum sudanensis)*. Cattle had been let in early in the fall so that little cover remained other than that afforded by the apple trees, weedy growth along the fence rows and a healthy growth of lamb's quarter *(Chenopodium album)* in some sections. The garden, fenced on all sides, was surrounded by pasture land. To the south and east the land was open, but to the north and west pasture soon gave way to extensive deciduous woodland. A section of this woodland, bordering a dirt road about 20 yards to the west of the garden, was included in the trapping area. The woodland contained medium sized oaks, ash, hickory, and along its edge, numerous red cedars *(Juniperus virginiana)*. A rank growth of Japanese honeysuckle *(Lonicera japonica)* had invaded the woodland borders.

TRAPPING SUCCESS ACCORDING TO HABITAT

Three rather sharply contrasting habitats were available for comparison within a short distance of each other — the deciduous woodland, the weedy fence row with small apple trees nearby, and the completely open and almost bare ground making up the larger part of the garden. Traps were placed in pairs in similar situations in each of the habitats, two about 30 yards apart in deciduous woodland, two about 40 yards apart in the garden and adjacent to a weedy fence row, and two about 30 yards apart in the open part of the garden. All traps were located within a radius of not more than 65 yards. Those with the most cover available were in the woodland. Branches and trunks of trees were heavily festooned with Japanese honeysuckle and the ground was covered with dead limbs, dead leaves and various vines and small plants. The traps along the fence row had an intermediate amount of cover. Within a few feet of each were small brush piles and apple trees about fifteen feet tall. Weeds growing along the wire fence offered some additional cover. The traps in the open were 15 yards from the nearest cover, this in the form of a stand of lamb's quarter about three feet high.

A second phase of this study consisted of comparisons between trapping success at the previously described sites in the woodland and along the fence row and two sites in the thick growth of lamb's quarter. The first part of the study was conducted between November 23 and December 8, 1953. Traps were in operation from about 8:30 A.M. until 4:30 P.M. (E. S. T.) Generally trapping was conducted for three successive days and then the traps were allowed to remain open for

two or three days. The first phase saw nine full days of trapping and the second 12 full days. The results of the November 23-December 8 tests are summarized in Table I.

TABLE 1

	Cardinal	Tufted Titmouse	Slate-Colored Junco	Red-Bellied Woodpecker	Blue Jay	Carolina Chickadee	Downy Woodpecker	Totals	Percentage
Woodland	2	11	10	2		1		26	.35
Fence Row	1	9	29		2		1	42	.57
Open Field	1		5					6	.08

Comparison of three habitats by number of captures and percentage for each.

A total of 57 percent of all birds trapped — 66 percent of the Slate-colored Juncos and 45 percent of the Tufted Titmice—were taken in the fence row locations. The woodland traps accounted for 35 percent of the birds taken. Among these were 55 percent of the Tufted Titmice and 23 percent of the Juncos. Only six captures were made in the open field, one a Cardinal and five Juncos.

When on December 9, the two traps in the open were moved to nearby stands of lamb's quarter, trapping conditions were beginning to change. A larger percentage of ground foraging birds of fence rows and weed patches were present. Slate-colored Juncos had increased in number and Tree Sparrows had put in an appearance. Also the coming of wintry weather had apparently caused a change in feeding and foraging habits.

The second phase of the habitat study, December 9 through January 13, saw twelve full days of trapping. During this period 475 captures were made in the traps. Of these 48 percent were Tree Sparrows and 35 percent Slate-colored Juncos. The results for each habitat are summarized in Table 2.

TABLE 2

	Cardinal	Tufted Titmouse	Slate-Colored Junco	Red-Bellied Woodpecker	Blue Jay	Carolina Chickadee
Woodland	2	11	35	2		
Fence Row	10	46	48		1	2
Weed Patches	3	2	81			

	Tree Sparrow	White-Br. Nuthatch	White-Thr. Sparrow	English Sparrow	Totals	Percentage
Woodland	46				96	.20
Fence Row	86	1	1		195	.41
Weed Patches	97			1	184	.39

Comparison of three habitats by number of captures and percentage for each.

The weed patch habitat was almost as productive as the fence row sites. Fence row traps accounted for 41 percent of the take and weed patches for 39 percent. The deciduous woodland accounted for only

20 percent of the take. The weed patch traps accounted for the largest take of Juncos, 50 percent, and Tree Sparrows, 42 percent. Tufted Titmice, formerly occurring most often in woodland traps, were most plentiful in fence row sites — 19 percent being trapped in woodland and 78 percent in fence row traps. Cardinals were taken more often during this period — 13 percent were taken in woodland, 67 percent along fence rows and 20 percent in weed patches. The fence row sites led in variety with eight species taken. Five species were taken in woodland and five in weed patches.

EXPERIMENTS WITH BAIT

Up until December 10 the only bait used was a medium scratch feed, about one part cracked corn to one part whole or cracked wheat. On December 10 sunflower seed was added to medium scratch in three of the traps. A trap from each habitat was baited with sunflower and their opposites were left with the customary scratch mixture. Trapping success was compared for the two mixtures during two days in December and three in early January. The results are summarized in Table 3.

TABLE 3

	Cardinal	Tufted Titmouse	Slate-Colored Junco	Red-Bellied Woodpecker	Carolina Chickadee	Tree Sparrow	Totals	Percentage
Sunflower Seed and Scratch Feed	2	27	30	1	2	19	81	68
Scratch Feed Alone		13	13	1		11	38	32

EXPERIMENTS WITH SCRATCH FEED AND SUNFLOWER SEED

Twice as many birds were taken, 68 percent, in traps baited with sunflower seed and scratch as in traps baited with scratch alone. During the period November 23-December 8, the three traps which were to be baited with sunflower seed took only 42 percent of the total catch of Juncos and Tufted Titmice. But with the addition of sunflower seed these same traps took 68 percent of the combined catch of Juncos and Tufted Titmice.

Tree Sparrows did not figure in the trapping totals before the sunflower tests were initiated. But with the choice of two mixtures 63 percent were taken in sunflower baited traps. With 63 percent of the Tree Sparrows and 70 percent of the Juncos showing up in sunflower baited traps it might be asked if this is coincidence or whether these species were actually attracted by the sunflower seed. No positive answer is available, but there is some evidence that sunflower seed may have made the difference. The writer observed Juncos eating sunflower seed at his feeding station during a light snow-fall in early February. Several birds were quite adept at maneuvering the seed between their mandibles until they removed the outer husk. Other Juncos merely picked up and dropped the seed, or ate tidbits made available by more proficient seed-openers. That Tree Sparrows, in particular, may be attracted by sunflower seed is seen in evidence offered by Gladys H. Schumacher (*Bull. Mass. Aud. Soc.*, **35**(5): 211-212. 1951). Writing

of the many sparrows and Slate-colored Juncos at her feeder in the Berkshires, she says: "Recently, during the winter, a lone Tree Sparrow came to stay for a few days. Oddly, he seemed to pick out the sunflower seeds to eat. These seeds seem to be more attractive to the birds than many realize, for most of our little visitors make away with them first."

TRAPPING SUCCESS AND TIME OF DAY

Visits to traps were spaced too unevenly to permit comparisons of take at set intervals through the day. But daily trapping records indicated an even distribution so far as captures are concerned. No morning or evening peak could be detected. And no appreciable difference existed in the number of birds taken in the morning and the afternoon. For a total of 18 trap days, 263 captures were made in the morning and 268 in the afternoon.

TRAPPING SUCCESS AND THE WEATHER

Owing to the lack of accurate weather data it was impossible to make any very close correlations between weather and trapping success. Only some rather general observations can be made. Extreme weather conditions appeared to have considerable effect upon trap take, but no positive correlations could be made in regard to normal day to day weather changes. In one instance more birds were taken during a rainy spell than during a preceding dry spell and later the exact reverse was true. And again no positive correlations could be made between moderate temperature changes and daily take. One day would see higher take with higher temperature and a week later a comparable take with lower temperature. Severe weather with snow, wind and low temperature, on the other hand, would produce an immediate reaction.

Five inches of snow fell on January 11. On this date and the following two days the weather was abnormally cold and windy. The average take for the January 11-13 period was 3.26 times as great as the average take during the period January 7-9 when the weather was mostly fair and comparatively mild. A much greater proportion of unbanded birds appeared in the traps during the period of severe weather. During the severe weather 30 percent of the birds entering the traps were unbanded. During the preceding period of mild weather only 13 percent of the birds taken were unbanded.

By January 14 most of the previous snowfall had disappeared, but late that day more snow began falling. On the morning of the 15th about three inches of snow with a thin icy coating covered the ground. The day was fairly mild (maximum temperature 38°) and a light rain fell in the afternoon. Despite the mildness conditions were unusually favorable for trapping, and feeding station activity was at an all-time high for the winter. Banding with one All-Purpose Trap outside the study area, the writer took 39 Starlings—the first trapped at the station.

The Starling, although plentiful in the region during winter, rarely comes to feeding stations and has frequented banding traps only when snow was on the ground. Other species are influenced similarly by snowfall. A light snowfall on March 11, 1954 saw the first Brown-headed Cowbirds of the season to be taken in banding traps, 21 in all.

The only Red-winged Blackbirds (two) to be taken at the station entered an All-Purpose Trap during this snowfall. Light snow fell off and on during the morning, but melted almost as rapidly as it fell. By early afternoon the snowfall had ended and remaining snow on the ground rapidly disappeared. With the appearance of bare ground Cowbirds and Redwings left the banding area.

In contrast to winter and early spring snowfalls, those in fall may even lessen activity at a feeding or banding station. Early in November of 1953 a first snowfall saw a reduction in the number of birds entering traps, both at my station and the station of Arthur H. Fast at Arlington, Virginia. Mr. Fast wrote: "I too noticed that the snow had the effect of apparently reducing the bird population. I have noticed that previously and wondered why. . . On the other hand in late winter and particularly in March, a snow seems to greatly increase the birds at times—presumably when they are caught in the area in migration." (Personal communication.)

During the fall natural foods are generally abundant. Fallen snow, acting as a receptacle for weed seeds, would tend to make this type of food more easily obtainable. Therefore, unless continuing snowfall or drifting snow covers over the seed as fast as they fall or are shaken loose by birds, food finding becomes easier and banding traps are not so likely to be attended. Against this is a psychological factor not so easily gauged. Almost everyone with a feeding station in northern latitudes has had an opportunity to note a sudden increase in activity when snow first begins falling or even some hours preceding a snowfall. It is perhaps a feeling of fear which sends birds crowding to known sources of food with the commencement or first threat of falling snow.

Much depends, no doubt, upon duration and depth of snowfall and upon accompanying weather conditions. Ice and drifting snow would tend to make natural foods unavailable. A prolonged period of freezing rain might well cause serious hardship unless artificial food was available. Birds seem to respond less to temperature changes than to precipitation. But after particularly cold nights birds seem to be more receptive to feeding and banding station foods. Certainly very low temperatures would increase the need for energy giving food and thereby tend to make birds less hesitant about entering banding traps.

DISCUSSION

Not nearly enough tests were made nor were the tests extended over long enough periods of time to provide adequate answers to the problems under study. But a beginning, at least, was made and the results indicate several approaches to the problem of greater trapping efficiency.

For the backyard bird-bander there is little point in talking about habitats. He makes out as best he can with his artificial surroundings. But in a rural environment there is a real problem in finding the habitat or habitats which will yield the best results. Fence row sites, near adequate cover and not far from woodland, were found to be the most productive in the study just described. A close second were sites in a stand of lamb's quarter which had taken over a portion of a former vegetable garden. Previous to the trapping experiments field foraging birds had been in the habit of coming to the stand to obtain an abundant

supply of small seeds. The birds readily took to scratch feed and sunflower seed when these were made available in banding traps. This suggests that there is a distinct advantage in locating traps in areas where birds are in the habit of coming for natural foods. The bander should consider the advantages of mobility before settling for a permanent banding station. There are any number of situations which attract birds temporarily at least. The All-Purpose Trap, incidentally, is a good one for mobile banding operations.

Woodland sites were considerably less productive than the fence row or weed patch sites. In addition mice were a greater problem here than elsewhere. They were continually at work carrying off grain and disturbing the dirt floors of the traps. Also the gray squirrel *(Sciurus carolinensis)* entered woodland traps more frequently than traps in the other habitats. Traps in the open without cover were almost completely neglected by birds. This was as to be expected and emphasizes the importance of cover in banding operations.

One point of importance, to be mentioned, is that of flight lines. For the biggest banding returns traps should be located along lines of flight to feeding or roosting areas. The fence row referred to in this study had long been an avenue of travel between woodland, the vegetable garden and open fields. Several banders attribute their success with certain species to the fact that their banding stations lie along well travelled flight lines. B. S. Bowdish (personal communication) of Demarest, New Jersey, who bands around 250 Blue Jays a year, thinks that his success with this species is due to the proximity of a flight line. Ben B. Coffey (personal communication) of Memphis, Tennessee who has had spectacular results with the Common Grackle and, to a lesser extent, the Starling writes that his home station was on a flight line one year and that a cooperator has been on a "line" for at least four successive seasons. The mixed flocks of Starlings and Grackles drop down to feed from three to five times a day.

Without recourse to experimentation many banders find that their take more than doubles when they use a richer mixture than they had previously used. The addition of sunflower seed in this study in half the traps boosted their take over traps with scratch alone by 50 percent. It should be mentioned, however, that elements of chance and variations in trap location may have influenced these totals. More tests along the same lines would be desirable as would comparisons between waterdrip and other baits.

A very real problem with banders who are away working most of the day is that of when to band. For example, would early morning or late evening be more productive? Casual findings from this study indicate that time of day had little influence upon trap take. However, careful studies might reveal some significant trends.

Another problem for the bander with limited time at his disposal is that of taking advantage of suitable banding weather. In this study there was no indication that normal weather changes affected banding results to any great degree. Severe weather conditions and snowfall particularly were seen to have very pronounced effects. Snowfall early in the season was found to reduce take in the banding traps, but later snowfalls greatly increased the take and sometimes brought new species

into banding traps. And significantly a much larger proportion of the birds taken during these later snowfalls were unbanded as contrasted with the take preceding a snowfall. This suggests that either the bird bander falls far short of taking all the common banding station visitors in his region or else that with severe weather birds move about much more and that the unbanded birds which show up at such times may well be outsiders.

It might be mentioned that at the feeding station birds seem to respond much more readily than at the banding station to weather changes. During five days in February, 1953 a feeding station near Leesburg was kept under observation by the writer from 9:30 A.M. until 10:30 A.M. The number of visits made by each species was recorded. The best attendance was on a bright sunny day after an unusually cold night. The poorest attendance was on a day with bright sunshine and a strong northwesterly wind. Attendance was average during a rain storm and on a partly cloudy day with no wind. The number of visits recorded during the observation periods varied from 103 to 213.

It would be interesting to compare over a period of time attendance at a feeding station with daily take at a nearby banding station. The experimenter would have to take into account the factor of diminishing return at banding traps which comes with continued operation. But if traps are in operation only a part of the day or at less frequent intervals (and when not in operation birds have free access to the bait) then the feeding station and banding trap are somewhat on a par. But for most birds, it is reasonable to assume, that the banding trap appears as an obstacle and only gradually does the bird become conditioned to entering it freely. Some individuals, as banders well know, become conditioned to such a degree that they become habitual trap attendants. Under the influence of conditioning, it seems likely, that a large proportion of banding station visitors become so addicted to trap feeding that they continue to come and go regardless of weather conditions. The same is doubtless true of the feeding station, but probably to a lesser degree. Almost any passing bird is apt to drop in at a feeding station. Thus with birds coming and going more freely feeding station attendance would be a more reliable index than that of the banding station as to how weather conditions influence the feeding activities of birds.

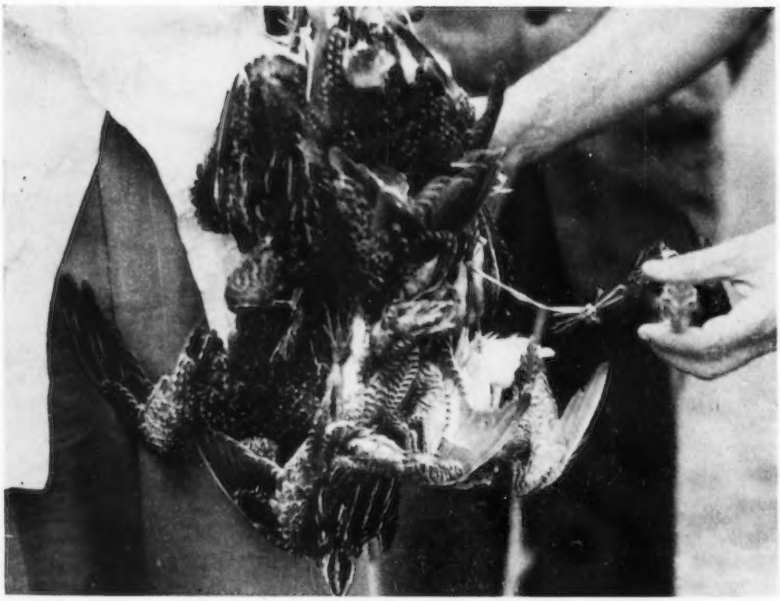
17 Liberty St., Nantucket, Mass.

BIRD-NETTING AS A TECHNIQUE FOR BANDING SHORE-BIRDS

BY ROBERT CUSHMAN MURPHY

In November 1953, while at Manila as a delegate of the United States to the Eighth Pacific Science Congress, I observed the results of netting by a method that might serve in banding procedure.

The Philippine bird-catchers go at night to the borders of the rice fields and capture birds by using electric torches and hand-nets. The latter, which I did not see, are said to be of two kinds, one a long-



handled net of "butterfly" type, but larger, and the other a casting net with weighted edges, such as is used for fishing in shallow water. Most of the victims are migratory waders from the northern hemisphere, but the catch includes also various resident species.

The birds spend the night in groups around such wet places as rice fields and they become so somnolent that they are not easily alarmed. The fowlers find their prey by means of the flashlights, which do not disturb the birds. They can approach quietly and bring down the nets over an entire huddle. The victims are taken to Manila in basket cages such as that shown in the accompanying photograph. They are kept alive in order to prevent putrefaction, which takes place rapidly in most dead Limicolae. Early in the morning they are strung on raffia by the legs and peddled to motorists along Dewey Boulevard. Usually the last example is sold by the middle of the forenoon, and the motoring populace seems to be well informed regarding the relative delicacy of the several species for the table.

Other visiting ornithologists and I talked with three of the bird-catchers, whose nightly bag at that season averaged fifty or more apiece. The list I made of the species has been checked and extended by Dr. D. L. Serventy, of Australia, and Dr. R. A. Falla, of New Zealand, both of whom purchased a variety of specimens and prepared them as study skins. The tally of 16 species follows. Since I made no exact count, the list indicates no more than approximate ratios.

Ixobrychus cinnamomeus	1
Anas crecca	1
Amaurornis olivacea	1
Rallus philippensis	1
Gallinula chloropus	1 adult, several young
Tringa glareola	120 on three strings
Tringa ocrophus	Several
Erolia subminuta	Several dozen
Erolia minutilla	Several
Gallinago gallinago	Several
Gallinago megala	25 or more
Gallinago stenura	Several
Rostratula benghalensis	Several
Charadrius dubius	Numerous
Charadrius alexandrinus dealbatus	Numerous
Charadrius dominicus fulvus	A few

Relatively few snipe and plover have been banded in the United States, at least when compared with ducks, gulls, etc. It seems likely that the Philippine method of nocturnal capture might work quite as well for us on salt-meadows and other marshy areas during the southward migration of latter summer.

American Museum of Natural History, New York

GENERAL NOTES

The Nesting of the Common Tern at Montezuma.—A new nesting locality for the Common Tern *(Sterna hirundo)* was reported recently by Sherwood (1954. *Wilson Bull.*, **66**(2): 145). Mention was made of a nest found at the Montezuma Marsh in 1953. To supplement this reporting the following observations are offered.

In connection with a muskrat research project, considerable time was spent on the Montezuma National Wildlife Refuge, Seneca County, N. Y., during the summer of 1948. The Black Tern *(Chlidonias niger)* was abundant and a few Common Terns were seen in a small section of the marsh surrounding a group of marl islands. Their presence among the many Black Terns and their association with this small area was very striking.

During the summer of 1949, the Common Tern seemed more abundant but was still confined to the vicinity of the small marl islands. Several of these islands were visited with Professor LeRoy C. Stegeman of the State University College of Forestry on June 9. Tern nests were found and photographed. Common Terns scolded overhead during the visit and landed at the nests after our departure.

On June 18, 1951, the marl islands were examined and two Common Tern nests were found. The nests were photographed and screens of one-quarter-inch hardware cloth, one foot high and two feet in diameter, were placed around them. The screens were used in an attempt to hold the young, when hatched, in the vicinity of the nest so that they could be successfully banded at the next visit. It was felt that a screen of this size would hold the young and still not interfere with the incubating or brooding activities of the adults. No Black Tern nests were found on the islands.

The following day, June 19, Black Tern nests were found in the bur-reed marsh community surrounding Goose Pond and two young were found in the water. They were photographed and banded (No. 241001 and 2) while the adults hovered overhead.

On June 20, a third Common Tern nest containing one egg was screened. In addition, screens were placed around three Black Tern nests in the bur-reed marsh. These were in a straight line, spaced eight feet between the first and second, and 12 feet between the second and third. They contained two, two and one eggs respectively. Later in the day two more Black Tern chicks were found in the marsh and banded (Nos. 241003 and 4). The adults were seen landing beside them soon afterwards.

When the three Black Tern nests that had been screened two days before were revisited on June 22, two of them contained an additional egg, now totaling two, three and two respectively. This would indicate that the screens were not interfering with the birds' activities. No. 241003 was found in the same locality as when banded.

On July 7 the eggs in the first nest screened on June 18 were hatching. Two eggs were completely hatched and the third was pipped. Assistance was given the last chick and the three were banded (No. 339826, 7, and 8). The young were photographed and the screen removed. The island was observed from a short distance and the adult Common Tern soon landed among the chicks. On this same day, the three Black Tern nests located in a row were found molested. The first now contained one crushed egg, the second no eggs, and the third two unharmed eggs. The screens had been dragged into the marsh. All screens were removed and no further observations were made in 1951.

In 1952 Mr. William L. Wylie made several observations on the Common Tern while studying waterfowl. In visits to the area, the Common Tern seemed to be frequenting a greater portion of the marsh.

In 1953 another graduate student, Mr. Frederick C. Dean, and his wife discovered a Common Tern nest along the southwestern edge of the Main Pool. This was during the week of June 21. It was located on a small hummock, possibly the remains of an old muskrat house. It was rechecked on July 7 with no sign remaining of eggs, young, or adults.

The marl islands, which were quite sizable when constructed in 1939 and the marsh flooded in 1942, have gradually become reduced in size from settling and the action of waves, ice, and muskrats. At the present time about one half are below the surface of the water and the remainder are small. Now that the Common Tern has become a regular summer resident on the area, it will be of interest to observe their presence as the islands become further reduced.

It is hoped that the above observations will be of help in establishing this as part of the regular breeding range of the Common Tern.—Maurice M. Alexander, State University of New York, College of Forestry, Syracuse, New York.

RECENT LITERATURE

BANDING

(See also Numbers 8, 10, 11, 12, 13, 32, 43)

1. A Short Review of Bird Banding in Japan. (Eine kurze Übersicht über die Vogelberingung in Japan.) Nagahisa Kuroda. 1954. *Die Vogelwarte* **17**(3): 201-205. Banding started in Japan in 1924; in the ensuing 20 years 418,825 birds of 80 species were banded, from which 15,926 returns and recoveries had been received by 1948. The raw data for all of these were published annually by the Division of Hunting Affairs of the Ministry of Agriculture and Forestry, under whose jurisdiction the banding was done. (One of the few complete sets of these mimeographed reports available outside Japan is in the library of the Museum of Comparative Zoology, Cambridge, Mass.) In this paper the author lists some of the more significant banding totals, return percentages, and recoveries, most of them prewar, and many of them previously published elsewhere. The only recent recoveries listed are two *Diomedea nigripes* banded in the "United States" (actually Laysan Ids., T.H.), one recovered in the North Pacific half way between Hawaii and Japan by a Japanese fishing boat in November 1949, the other 23 miles off northern Honshu in June 1953.

Most of the birds banded in Japan before World War II were purchased for the purpose by the government from the professional netters who were catching them for market, in much the same fashion that our Bureau of Fisheries obtains the fish it tags. The author concludes: "Since the war banding has been limited to a few species, largely because of the prohibiting of mist-netting of small birds for conservation purposes. What Japan needs for the future is to improve its official ringing system, and to make it available to professional [private] ornithologists (which has already occurred in individual cases through the delivery of bands upon request). The extension of the ringing system internationally throughout the Far East is to be desired, but is very difficult of course under the present situation in Japan."—O. L. Austin, Jr.

2. The Trapping Equipment at the Serrahn Sanctuary. (Die Fangeinrichtungen der Vogelschutz-Station Serrahn.) Hubert Weber. 1954. *Journal für Ornithologie* **95**(3/4): 292-296. A general description of the sanctuary near Neustrelitz, Mecklenburg and the trapping methods employed there for banding, with photographs of the throw nets and tree traps in operation. The banding is done by volunteer collaborators, who ringed 10,104 birds, most of them small passerines, between the autumn of 1949 and March 1953. Among the most interesting species handled were "invasion birds" from the north, Crossbills, Siskins, and Redpolls; some of the more significant recoveries obtained from these bandings are summarized.—O. L. Austin, Jr.

3. Results of Bird Banding in Belgium received in 1953. (Resultats du Baguage des Oiseaux en Belgique Exercice 1953.) R. Verheyen. 1954. *Le Gerfaut*, **44**(4): 309-324. Lists the raw data received in 1953 for some 225 returns and recoveries of some 60 species. To save space, short-term returns have been omitted, and only those of more than passing interest, as for their longevity, are included. Most of the recoveries are from France, Spain, and Portugal, with a few from almost all other European countries outside the Iron Curtain, and a respectable number from North Africa. Of exceptional interest are a *Delichon urbica* banded in June and recovered the following March in South Nigeria, several *Anas crecca* and *Anas platyrhynchos* taken in northern Finland, an *Actitis hypoleucos* banded in May 1952 and reported the following November from French Guinea, and a *Vanellus vanellus* taken after 7 years 13 miles from where it was banded near Antwerp.—O. L. Austin, Jr.

MIGRATION

4. Sun Compass Orientation and Endogenous Activity Rhythms of the Starling *(Sturnus vulgaris* L.). Kenneth S. Rawson. 1954. *Zeitschrift für Tierpsychologie*, **11**(3): 446-452. At Cornell University two Starlings, captured

as adults, were "trained in a small cage to indicate compass directions using the sun as the basis for orientation. The birds indicated the training direction when tested during the time of day when they had been trained. When tested at another time of day, the birds chose directions intermediate between the training direction and the direction having the same angle to the position of the sun as at the time of training." Experiments were also made with artificial days. "One bird continued a 24-hour pattern of activity under constant conditions (light, sound, temperature) for a period of two weeks," but a shifted schedule of light and dark shifted this bird's pattern after 4 days.—M. M. Nice.

5. Studies on the Internal Time-Sense in Birds in Relation to Orientation. (Versuche zu der im Richtungsfinden der Vögel enthaltenen Zeitschätzung.) Klaus Hoffmann. 1954. *Zeitschrift für Tierpsychologie*, **11**(3): 453-475. Three hand-raised Starlings were trained to definite compass directions; in one bird this training was found to last 10½ months. "A central nervous mechanism must be postulated to allow for diurnal changes in the sun's azimuth position. An 'internal clock' must be one of the basic components of this mechanism." Experiments were made with different "artificial days." "Throughout a period of 28 days with constant light and approximately constant temperature the choice of compass direction did not vary, though the activity rhythm seemed to be greatly upset." This important study from Dr. Kramer's laboratory presents 21 charts and an extensive bibliography.—M. M. Nice.

6. The Orientation of Homing Pigeons in Relation to Change in Sun Declination. Kenneth S. Rawson and Anne M. Rawson. 1955. *Journal für Ornithologie*, **96**(2): 168-172 (with German summary). Reviews briefly Matthews' sun navigation hypothesis and his sun occlusion experiment at Cambridge in support of it, and describes a similar experiment carried out at Wilhelmshaven in 1953, the results of which "are not in agreement with those of Matthews and do not support his sun navigation hypothesis."—O. L. Austin, Jr.

7. A Further Experiment to Influence the Orienting of Carrier Pigeons by the Seasonal Change of the Sun Altitude. Simultaneously a Critique of the Theory of the Experiment. (Ein weiterer Versuch, die Orientierung von Brieftauben durch jahreszeitliche Anderung der Sonnenhöhe zu beeinflussen. Gleichzeitig eine Kritik der Theorie des Versuchs.) Gustav Kramer. 1955. *Journal für Ornithologie*, **96**(2): 173-185 (with English summary). To check the discrepancies between the results of the Matthews and Rawson experiments (see No. 6 above) the author repeated the experiment in 1954 at Wilhelmshaven. The results were again negative and failed to support the sun navigation hypothesis. He suggests possible explanations of the conflicting results between the Cambridge and Wilhelmshaven experiments, and attempts a further clarification of some of the astronomical and psychological technicalities involved in the proposed theory. —O. L. Austin, Jr.

8. On the Migration and Wintering of *Larus melanocephalus* Temminck. (Sur les Migrations et l'Hivernage de *Larus melanocephalus* Temminck.) Noël Mayaud. 1954. *Alauda*, **22**(4): 225-245. (English summary.) From the many Russian-banded Mediterranean Black-headed Gulls picked up in western Europe during the last few years, somebody has been banding this species regularly in some numbers on Orlov Island in the Dnieper Estuary on the north coast of the Black Sea. Other than the acknowledgements from Moscow to those who reported the bands, no word of this banding or its results has come from behind the Iron Curtain. M. Mayaud has succeeded in gathering from the non-Russian literature and other sources in western Europe the data on about 100 of these recoveries. All were banded at Orlov as juveniles in late June and early July between 1947 and 1953. These records, together with observations on the species in the available literature, allow him to present an interesting delineation of the species' postnuptial movements, which start apparently in late July.

Instead of moving southward, the Orlov gulls migrate westward; none of them has been reported from the eastern Mediterranean. By August and September the main migration reaches the Adriatic, and by October is on its principal wintering

ground in the western Mediterranean between Sicily and Gibraltar. Smaller contingents move northwestward up the Danube as far as Switzerland, and probably across the Ukrainian and Polish Steppes and the Pripet Marshes to the Baltic and North Seas, and thence westward to the Bay of Biscay. The species leaves for its nesting grounds between March and May.

It is a shame that whoever is doing the banding at Orlov is unable to publish the results of his work on this interesting species. He must have a great deal of information to share with ornithologists elsewhere in the world, who would be happy to learn of his findings.—O. L. Austin, Jr.

9. The Passage of Black Terns through Britain in Spring 1954. R. F. Dickens. 1955. *British Birds*, **48**(4): 148-169. A detailed, well-documented study with 7 tables and 2 maps of a large migration of *Chlidonias niger*. It was found that both this and other large passages had "been preceded by a rise in temperature in the Iberian Peninsula and the Biscay area" and took place "in face of easterly or north-easterly winds over the British Isles." It was concluded that the terns "had been carried west of their normal routes by easterly lateral winds in the Biscay area."—M. M. Nice.

10. Migration of the Dunlin in Northern Europe. (Rylens *(Calidris alpina* (L.)*)* traek i Nordeuropa.) Arne Nørrevang. 1955. *Dansk Ornithologisk Forenings Tidsskrift*, **49**(1): 18-49 (from the English summary). Recoveries from the large numbers of Dunlins banded in northern Europe in recent years allow its autumn flight to be traced with fair certainty. From their northern breeding grounds the birds follow several routes southward and southwestward (mapped on p. 34), down the west coast of Europe to the Atlantic coast of Africa, and across central Europe to the Mediterranean. Returns in subsequent years at the banding stations show individuals tend to follow the same routes year after year. Very little is known about the northward movement in spring, other than that the birds dally less on the way and move much more quickly than they do in autumn.—O. L. Austin, Jr.

11. Recovery of Ringed Harriers. J. S. Watson. 1954. *Notornis*, **6**(1): 6-10. The author finds the Australasian Harrier, *Circus approximans*, an excellent subject for study of movements by banding. It is easily caught in a top-entrance trap baited with dead rabbits (no problem to obtain in New Zealand), and as many Harriers are shot for the bounty paid by the local Acclimatization Societies, the rate of recovery is high. Of 142 Harriers banded in 1951 and 1953, 32 or 22.5 percent had been reported by 1954. At the time of writing 206 Harriers had been marked, 35 recovered, and 14 retrapped in subsequent years where ringed. "The returns indicate that the old birds tend to stay within a radius of about five miles but a proportion of the young ones disperse up to several hundred miles from where they were ringed."—O. L. Austin, Jr.

12. The Brambling in Belgium. (Les Pinsons du Nord *(Fringilla montifringilla* L.*)* en Belgique.) R. Verheyen. 1954. *Le Gerfaut*, **44**(4): 324-342 (with Flemish summary). From banding data on the Brambling, including 127 repeats, 65 returns, and 47 recoveries of birds banded in Belgium, and 56 Belgian recoveries of birds banded elsewhere, the author concludes: Most migrant Bramblings reach their wintering grounds in western Europe during the last half of November. Each individual's winter range (50 kilometers) is more extensive than its summer range (4 pairs per square kilometer). When they leave for the north, the Bramblings migrate on a wide front. Because of their tendency to migrate against the prevailing winds, chiefly of maritime origin, individuals may reappear on the wintering grounds of the preceding year if the air currents are identical or nearly so both years. If atmospheric conditions vary in successive autumns, the migrants establish themselves in different winter quarters (Belgian wintering birds taken in later winters in France, Italy, Great Britain). The migrant recognizes the wintering ground of the preceding year by its particular topography, as well as by certain natural obstacles it has to bypass or skirt as it did before. The migrant is not attached to the wintering ground of the preceding year to the same degree as to its birthplace or breeding place, where he

will spend months on end if he must, but seems to give priority to the abundance of food and the companionship of his kind rather than to the configuration of the topography.—O. L. Austin, Jr.

13. The Linnet, a Breeding Bird and Winter Visitor in Belgium. (Les Linottes, *Carduelis cannabina* (L.), Nicheurs et Visiteurs d'Hiver en Belgique.) R. Verheyen. 1955. *Le Gerfaut*, **45**(1): 5-25 (with Flemish summary). From an analysis of 703 banding records of Linnets banded or recovered in Belgium, the author concludes: The Linnet returns to nest in the same place it bred the year before, which is the country of its birth. As the average age of the Linnet is 7 months and its annual mortality above 80 percent, the species must raise two broods annually totalling 10 young to maintain its numbers. (As the "average age of 7 months" is computed by taking the average duration of life in months of 86 recoveries banded as nestlings, it is not a reflection of mortality, and in no way measures the needed replacement!) When the young take wing the Linnets gather in flocks and seek feeding grounds near by, seldom moving more than 100 kilometers. Migration starts in early October, ends towards mid-November. Birds wintering in Belgium are those raised there or in neighboring regions. The rate of migration does not exceed 80 kilometers per day. Belgian migrants return to their nesting grounds toward mid-April, others continue passing through until May. Migrants crossing Belgium are mostly from Sweden, Denmark, northwest Germany, and the Netherlands; a few from southeast Norway, central Germany, and eastern England. The migratory movement is NE-SW, and the path of flight is not wider than 370 kilometers. Linnets prefer to migrate against the wind, and are probably favored by the warm, humid, southwest winds which prevail over southwest Europe in October and November.—O. L. Austin, Jr.

14. The Autumn Migration in Eastern Kurdistan. (La Migration d'Automne dans le Kurdistan Oriental.) X. Misonne. 1955. *Le Gerfaut*, **45**(1): 33-67 (with Flemish summary). An interesting paper delineating the probable routes followed by most migrants through Iran, based on the literature and the author's two seasons of observations in the northwest corner of the country, southeast of the Caspian Sea. Of unusual interest is the east-west migration of the Rose-colored Starling, *Pastor roseus*, which breeds in the Turkish and Caucasian steppes and skirts the southern end of the Caspian Sea on its way to its wintering grounds in India. The author's specific notes on numbers and dates of birds observed are even more valuable than his theorizing on the movements of birds through this little-studied region.—O. L. Austin, Jr.

15. The Migration of the Wood Warbler. (Die Wanderungen des Waldlaubsängers *(Phylloscopus sibilatrix)*.) Erwin Stresemann. 1955. *Journal für Ornithologie*, **96**(2): 153-167. A detailed study of the Wood Warbler's movements as shown by the literature and 16 recoveries, mostly of nestlings banded in England, Germany, Sweden, and Latvia. The species breeds across Europe from Scotland to the Urals and winters in central Africa from the Gold Coast through the Congo. In the autumn the birds migrate in a "flight funnel" (Zugtrichter) extending from the flanks of the Pyrenees to the west coast of Greece, and centering on southern Italy. Thus the westernmost populations at first move southeast, the easternmost birds southwest. From the Mediterranean they continue southward. In the spring the easternmost and westernmost populations shorten their return flight. They appear in Morocco, Egypt, Palestine, and Syria only in spring (Schleifenzug). The North German Wood Warblers migrate 5,500 kilometers to their wintering grounds. They spend an estimated average of 100 days on the breeding grounds, 62 days in the fall migration, 172 days on the wintering grounds, and 29 days in the spring flight. They migrate about twice as fast in spring, 180 kilometers per day, as they do in fall, 90 kilometers per day. These distances are mathematical averages; actually the migration is performed in great jumps separated by rest periods of several days during which the birds replenish their deposits of body fat.—O. L. Austin, Jr.

NIDIFICATION AND REPRODUCTION

(See also Numbers 26, 30, 31, 36, 38, 39, 41, 43)

16. Incubation Periods Throughout the Ages. M. M. Nice. 1954. *Centaurus* [International Magazine of the History of Science and Medicine—Copenhagen] **3:** 311-359. A historical review from Aristotle to the present. "For the most part the 2300 years during which men have recorded their thoughts on incubation periods make a sad story of the blind leading the blind." An admirable paper, complementing Mrs. Nice's "Problems of Incubation Periods in North American Birds," *The Condor*, **56:** 173-197, which summarized the history of incubation periods in the Old World in less than two pages.—E. Alexander Bergstrom.

17. The Abnormal Breeding of Birds in the Winter 1953/54. D. W. Snow. 1955. *British Birds*, **48**(3): 120-126. The last 3 weeks of November 1953 were very mild with no normal seasonal drop in temperature; December was the mildest in Britain since 1934. The first 10 days of January were cold, the next fortnight mild, the last week unusually cold. Blackbirds, *Turdus merula*, Song Thrushes, *T. philomelos*, Robins, *Erithacus rubecula*, Starlings, *Sturnus vulgaris*, and House Sparrows, *Passer domesticus*, were all reported as nesting. The fate of many of the nests was not known. Of 13 Blackbird nests from November to January only one brood was surely known to have fledged—on Jan. 31. Of 10 Song Thrush nests, 3 were known to have been successful, young fledging the end of December and in January.—M. M. Nice.

18. Further Notes on the Swift, 1944-1954. A. S. Cutcliffe. 1955. *British Birds*, **48**(5): 193-203. A study of a colony of *Apus apus*, all members of which were banded from 1948 on. Some breeding males migrated in the summer before their mates, yet the pair returned together in the spring. Often a banded pair are accompanied by an unbanded male, who closely pursues them; occasionally the female has nested with this new bird instead of with her former mate. A ringed pair of Swifts were removed from their nest in which no eggs had yet been laid, taken 180 miles south by car, and released at 6 p.m.; they returned to the nest together at 8 p.m. the following day.

A total of 122 birds including 39 nestlings have been ringed; 19 ringed as breeders or non-breeders (apparently one-year-old birds that pair and occupy a nest but do not lay until the following year) have returned, but not a single nestling. The only recovery was a 3-year-old bird found dead 14 miles from the place of ringing. The number of eggs laid in the colony was 58, the number of young fledged 31, 53 percent of success. The summer of 1954 was cloudy, cold, and rainy, and the Swifts in the colony were unable to raise a single nestling. These birds are heavily parasitized by the hippoboscid fly *Crataerina pallida*. During periods of starvation as in bad weather, the parasites must contribute to the mortality of their hosts.—M. M. Nice.

19. The Fledging of a Brood of Ravens. E. F. Warren. 1955. *British Birds*, **48**(4): 172-175. Detailed observations on the nest-leaving of a brood of 5 *Corvus corax*, on Skokholm, Pembrokeshire, May 10-12, 1953. The parents "appeared to take no part in encouraging the young to leave the nest but were generally on hand to accompany or defend the young bird at the time of its first flight. The young birds were generally silent on the ledge and appeared not to be fed."—M. M. Nice.

20. Nest-Boxes Designed for Sand Martins. B. R. Henson and J. D. Johnston. 1955. *British Birds*, **48**(4): 180. To facilitate nesting studies, five nest boxes were constructed for Bank Swallows, *Riparia riparia*, in the top of a high sea-cliff in Hampshire 30 yards from a natural colony of 12 pairs. All were used. A vertical shaft was dug and lined with wood, and a tunnel bored out to the cliff face was lined with wood on the top and sides. A false lid was inserted just over the nesting chamber, and a turf-covered lid on top of the vertical shaft. A sketch illustrates the device.—M. M. Nice.

21. The Incubation Rhythm of the Fulmar. Kenneth Williamson. 1952. *Scottish Naturalist*, **64**: 138-147. One bird at Fair Isle was observed to incubate 32 days out of a total of 53 for the brood; another pair showed a less striking difference; the third pair divided the duty more evenly. Time between change-overs was generally 2½ to 5 days, but in one case, almost 9 days. Fledging periods for three broods were about 50, 54 and 56 days.—E. Alexander Bergstrom.

22. The Fledging of a Group of Young Fulmars. Kenneth Williamson et al. 1954. *Scottish Naturalist*, **66**: 1-12. Aided by several young assistants, Williamson made continuous observations of a number of young Fulmars toward the end of their fledging period. The majority left the cliff voluntarily, but some as the result of accident or adult interference. "Several of the cases suggest that the parent fulmar is eager to reclaim the nesting-ledge, perhaps to deny it to prospecting non-breeders, and in order to recover it will attempt to hasten the departure of the chick."—E. Alexander Bergstrom.

LIFE HISTORY

23. Life History of the Tropical Kingbird. Alexander F. Skutch. 1954. *Proc. Linn. Soc. N. Y.*, Nos. 63-65: 21-38. Detailed observations on *Tyrannus melancholicus*—the race which occurs in the lower Rio Grande valley in Texas is known as Couch's Kingbird.—E. Alexander Bergstrom.

BEHAVIOR

(See also Numbers 19, 37)

24. The Behavior of Birds Attending Army Ant Raids on Barro Colorado Island, Panama Canal Zone. R. A. Johnson. 1954. *Proc. Linn. Soc. N. Y.*, Nos. 63-65: 41-70. Raids by army ants, particularly in their nomadic periods, attract a variety of birds, to feed not on the ants but on the many insects flushed out by the ants. The relationships of the different species of birds to the ant raids vary markedly; some, especially Antbirds, obtain most of their food by following an ant colony in its nomadic period. When a colony enters the less active statary period, the Antbirds transfer their attentions to a different colony.—E. Alexander Bergstrom.

25. Studies on the Releasing of Gobbling in the Turkey. (Untersuchungen über die Auslösung des Kollerns beim Truthuhn *(Meleagris gallopavo)*.) Margret Schleidt. 1954. *Zeitschrift für Tierpsychologie*, **11**(3): 417-435. Intensive observations at Buldern on wild and domestic toms. The effective sign stimuli for gobbling were found to be sounds containing frequencies between 200 and 6,000 cycles per second. The innate releasing mechanism appears to be "everything the cock is able to hear and which, by a certain sound intensity, 'contrasts with the background.'" "The gobbling of the turkey-cock is a consummatory act; it belongs to a special sub-drive of the general reproductive drive."—M. M. Nice.

26. Some Observations on the Reproductive Behaviour of Rooks. Derek Goodwin. 1955. *British Birds*, **48**(3): 97-105. Observations at a rookery of some 28 nests of *Corvus frugilegus* at Windsor Castle, Berkshire. Ordinarily male and female cooperate in nest-building, but "An unpaired female built an apparently perfect nest by herself and another female who was paired to a yearling male appeared to do so." A great deal of stealing of nesting material went on. The "Rook shows an homologous innate attacking reaction to the sight of others of its kind copulating, as do pigeons (Heinroth, 1949) and many other birds." A one-legged female was attacked far more often than the normal birds. "An animal in an apparently 'neutral' state often seems *to become enraged* at the sight of the abnormal movements of an injured fellow. It appears to be motivated by some feeling homologous with the 'indignation' that humans often show towards one of their number who behaves in an abnormal or unconventional manner."

Other subjects discussed are the "food-begging, and submissive displays," yearlings at the rookery, and the nesting attempt of an unmated female, who seemed clearly to suffer from hunger with no mate to feed her.—M. M. Nice.

27. The Significance of Voice in the Behaviour of the Little Ringed and Kentish Plovers. K. E. L. Simmons. 1955. *British Birds*, **48**(3): 106-115. Eight notes are described for the adult *Charadrius dubius* and two for the chicks; comparisons are made with notes of *Ch. alexandrinus*. Studies on voice show the presence of both attack and escape tendencies in pair behavior. The alarm-call of the chicks "stimulates intense predator-reactions in the parents."—M. M. Nice.

28. Myrtle Warbler in Devon; a New British Bird. F. Raymond Smith. 1955. *British Birds*, **48**(5): 204-207. During a blizzard January 4, 1955 a male *Dendroica coronata* appeared at a feeding table near Exeter; it established a feeding territory around the table and drove off Blue Tits, *Parus caeruleus*, with great vigor, at times also chasing off Great Tits, *P. major*, Dunnocks, *Prunella modularis*, and Chaffinches, *Fringilla coelebs*, as well as a Bullfinch, *Pyrrhula nesa*, and Pied Wagtail, *Motacilla alba*. On February 10th after a new cold snap the bird was found dead. "One possible explanation of the intense antipathy of the Myrtle Warbler to the resident Blue Tits may be that a colour reaction was set up by the blues and yellows being of similar shades to those of male Myrtle Warblers in full plumage." I can find no accounts of behavior of Myrtle Warblers at feeding shelves in this country. Four beautiful photographs of this wandering individual are reproduced.—M. M. Nice.

29. Buildings as Song-Posts. Derek C. Hulme. 1955. *British Birds*, **48**(5): 211-215. On a 2-mile built-up route in the Midlands the singing posts of all birds were noted throughout 1952; 46 percent of these were on buildings or other man-made structures. One thousand and eight records were on natural perches, 409 on chimney-pots, 171 on the gable end ridge tile of buildings, and 59 on low power electric cables.—M. M. Nice.

ECOLOGY

(See also Number 24)

30. Ecological Relations of Jaegers and Owls as Lemming Predators near Barrow, Alaska. Frank A. Pitelka, P. Quentin Tomich and George W. Treichel. 1955. *Ecological Monographs*, **25**: 85-117. A fine study from 1951 to 1953 of avian predation on *Lemmus sibiricus*, that were at a low during the first year, and then increased, becoming abundant in 1953. The chief predators of the brown lemming followed the same pattern. The Pomarine Jaeger, *Stercorarius pomarinus*, enjoyed less nesting success "in the dense population of 1953 than in the sparse one of 1952." These birds are strongly territorial throughout the nesting cycle of 10-11 weeks. "Each pair occupies an all-purpose territory, as in many passerines. In the densely occupied area of 1953, minimal territory size was estimated at 15-20 ac., where in 1952, territory size on the most densely occupied area was approximately 110 ac." The Snowy Owl, *Nyctea scandiaca*, and Short-eared Owl, *Asio flammeus*, are also very important lemming predators. The authors point out what an unusually fertile field for study is offered by the jaegers. The Pomarine Jaeger appears to be a highly mobile species, concentrating for breeding purposes where the lemming population is high. The authors suggest that it seems impossible that "this species could maintain itself if two- and three-year intervals of non-breeding were regularly inevitable," and that "it may prove possible to maintain that the concept of regional synchrony in the lemming cycle is spurious." They conclude that "Avian predators successfully depress lemming populations at least in the upswing portion of the cycle to the extent that the fluctuations of the prey are dampened and protracted."—M. M. Nice.

31. Temperature Regulation in Young Pelicans, Herons, and Gulls. George A. Bartholomew, Jr. and William R. Dawson. 1954. *Ecology*, **35**(4):

466-472. Very interesting work on a desert island in the Gulf of California where air temperatures are moderate but solar radiation intense. The naked, black young of the Brown Pelican, *Pelecanus occidentalis californicus* were profoundly affected by environmental conditions; when their parents were prevented from brooding by the presence of the observers, their diurnal temperature range was from 21.4 to 43.7° C. "Homeothermy increased with development of down; total diurnal range in large downy young was 37.8 to 41.° C." The pelicans were the most attentive parents of all three species. Newly hatched Great Blue Herons, *Ardea herodias treganzai*, with their long fine down showed somewhat better temperature regulation, their diurnal range being 32.2 to 43.3° C. Their parents were somewhat less attentive. The chicks of the precocial Western Gull, *Larus occidentalis livens*, are well insulated, and at a very early age are able to seek shelter from the sun in crevices. The temperatures of these young chicks ranged between 34.6 and 43.3° C. Their parents were the least attentive of all. "The successful nesting of these three species in the same area at the same time despite their differences in capacity for temperature regulation emphasizes the importance of behavior as a supplement for physiological mechanisms in birds."—M. M. Nice.

WILDLIFE MANAGEMENT

(See also Numbers 34, 38, 39)

32. Investigations of Woodcock, Snipe and Rails in 1953. Special Scientific Report—Wildlife No. 24, U. S. Fish and Wildlife Service and Canadian Wildlife Service. January, 1954, 68 pp., photo-offset. This is the third report of its kind (for the others, see *Bird-Banding*, **23**: 183-84, October, 1952, and **24**: 119-120, July, 1953). It includes: "Summary of 1953 Woodcock, Snipe and Rail Investigations," by John W. Aldrich; "Wintering Woodcock Populations in West-Central Louisiana, 1952-53," by Vincent H. Reid and Phil Goodrum; "Observations of Woodcock Breeding in Certain Southeastern States," by Vincent H. Reid and Phil Goodrum; "Woodcock Singing Counts, Eastern Canada, 1953," by Victor E. F. Solman; "Woodcock Census Studies in Northeastern United States, 1953," by Howard L. Mendall; "Woodcock Singing Ground Counts in Central-Eastern United States, 1953," by P. F. English; "Woodcock Breeding Ground Counts in Central-Northern United States, 1953," by John W. Aldrich; "Summary of Massachusetts Woodcock Studies, 1953," by William G. Sheldon; "Investigations on Woodcock in Michigan," by Lytle H. Blankenship; "Wilson's Snipe Wintering Ground Studies, 1952-53," by Chandler S. Robbins; "Wilson's Snipe 'Winnowing' Counts in Eastern Canada, 1953," by Victor E. F. Solman; "Further Investigations on Winnowing Method of Measuring Wilson's Snipe Populations," by Chandler S. Robbins; and "Wilson's Snipe and Sora Rail in Yampa River Valley, Colorado," by Hal M. Boeker.

The 1953 season was marked by the general adoption of a method of obtaining an index to woodcock numbers on the breeding ground, rather than attempting to make an exact count of all birds calling along the route. Definite stopping points no closer than .4 mile are established, with intervals increased as much as necessary to avoid "non-woodcock habitats."

Robbins notes 963 Wilson Snipe banded in North America prior to the winter of 1952-53, with 34 recoveries (3.4%—cf. 5% for the same species in England, based on over 2,000 birds). There have been four interstate recoveries: Newfoundland to Guadeloupe, French West Indies; Massachusetts to North Carolina; New York to Ontario; and California to British Columbia.—E. Alexander Bergstrom.

33. Investigation of Woodcock, Snipe and Rails in 1954. Special Scientific Report—Wildlife No. 28, U. S. Fish and Wildlife Service and Canadian Wildlife Service. February 1955, 62 pp., photo-offset. Contents are: "Summary of Investigations of Woodcock, Snipe and Rails in 1954," by John W. Aldrich; "Wintering Woodcock Populations in West-Central Louisiana," by Vincent H. Reid and Phil Goodrum; "Woodcock Singing Ground Counts in Canada, 1954," by R. D. Harris; "Woodcock Census Studies in Northeastern United States, 1954," by Howard L. Mendall; "Woodcock Singing Ground Counts in Central-Eastern

United States, 1954," by P. F. English; "Woodcock Investigations in the Central-Northern United States, 1954," by John W. Aldrich; "Massachusetts Woodcock Studies, 1954," by William G. Sheldon; "Wilson's Snipe Wintering Ground Studies, 1953-54," by Chandler S. Robbins; "Wilson's Snipe Populations and Hunting Pressure in the Northwest," by Thomas D. Burleigh; "Some Observations on Nocturnal Activity of Wilson's Snipe—Newfoundland (1953)," by Leslie M. Tuck; "Distribution and Abundance of the Wilson's Snipe in Western Canada," by Chandler S. Robbins; and "Sora Rail Populations in Alberta, 1953-54," by Allen G. Smith.

Dr. Aldrich comments, "It is becoming apparent that the main weakness in our present effort to obtain a breeding ground index of woodcock abundance is that we are attempting to measure populations in areas of suitable habitat but without consideration of how much change is taking place in the total amount of this habitat."

Tuck made a detailed comparison of post-sunset and pre-dawn winnowing of snipe. Partly through a field trip as far as the Yukon, Robbins drew up a tentative map of the breeding distribution and abundance of the species throughout Canada. Smith found indications of wide fluctuations in the abundance of the Sora on the Alberta prairies, with very large numbers in peak years.—E. Alexander Bergstrom.

CONSERVATION

34. Bird Preservation in Greenland. (Fredning af fuglelivet i Grønland.) Finn Salomonsen. 1955. *Dansk Ornithologisk Forenings Tidsskrift*, **49**(1): 3-11 (from the English summary). A plea for more stringent hunting regulations and enforcement to restore and maintain the populations of several species now in danger in Greenland. The Eider, which was almost exterminated early in the century by wholesale shooting and egging, is now increasing gradually under protection given it in 1924. The Ptarmigan is also protected in summer in southwest Greenland, and new regulations were passed in 1951 protecting all geese on their breeding grounds. Most seriously threatened at present are the Arctic Tern, Puffin, Murre, and Cormorant, mostly by egging rather than by shooting. In the Grønne Islands in Disko Bay at least 100,000 Arctic Tern eggs are collected each summer, and the species has decreased considerably in recent years. Dr. Salomonsen makes specific recommendations for the protection of these four species.—O. L. Austin, Jr.

35. A Medical Aspect of the Population Problem. Alan Gregg. 1955. *Science*, **21**(3150): 681-682. If the life on the earth is likened to an organism, then it might be considered that "the world has cancer, and that the cancer cell is man." The extinction of endemic forms of life on islands by "the murderous invaders" is compared to the fatal growth of cancer in the skull. "To what degree can colonization of the Western Hemisphere be thought of as metastasis of the white race?" "Cancerous growths demand food; but, so far as I know, they have never been cured by getting it. . . . The analogies can be found in 'our plundered planet'—in man's effect on other forms of life." Our slums resemble the necrosis at the center of a cancer—"the death and liquidation of the cells that have, as it were, dispensed with order and self-control in their passion to reproduce out of all proportion to their usual number in the organism." An illuminating diagnosis of the greatest problem facing the world, both in the realm of conservation and the future of mankind.—M. M. Nice.

PARASITE AND DISEASES

(See also Number 18)

36. Additional Records of Protocalliphora (Diptera) in Birds' Nests. D. F. Owen. 1955. *British Birds*, **48**(5): 225-229. Of 351 nests of 46 species of birds examined, 61 nests of 13 species were found infested, about 17 percent. These were largely hole-nesting species. A list is given of all nests examined, as well as details on the nests affected by the flies.—M. M. Nice.

PHYSIOLOGY AND PSYCHOLOGY

(See also Numbers 4, 5, 6, 7, 25, 28)

37. Experiments on the Visual Field of Ducks. (Versuche über den Gesichtskreis der Enten.) Carlheinrich Engelmann. 1954. *Zeitschrift für Tierpsychologie*, **11**(3): 436-445. Experiments were carried on with 6 Pekin Ducks from the age of 1 week to 10 months, with 6 others aged 6 to 12 weeks and with 2 birds of undetermined race a year and a half old. Adult ducks recognized the food dish — a white plate — at 10 meters, young ducks at 5. "Groups of maize grains were recognized at 4 meters, of wheat at 2½ meters, single maize grains at 3, single wheat grains at 0.7 meters." Fellow members of the species were recognized at 60-70 meters in open country. In contrast to chickens, ducks prefer open country, avoiding bushes, undergrowth and woods; they seem to need an unobstructed view above them. So far as possible they follow known paths, and they do this so intently that they ignore such important objects as known comrades. In unfamiliar surroundings, they are very alert to the presence of comrades and at once attempt to join them. "The visual reactions of ducks are considerably handicapped by their characteristic shyness and propensity to escape reactions and also by the fact that they pay little attention to things in their immediate neighborhood, a property which, perhaps, can be explained by their life on the water. Compared with chickens, ducks have a considerably wider field of vision. They see distant goals better than chickens do, but they are not as good at recognizing objects quite near to them."—M. M. Nice.

38. Preliminary Studies on the Use of a Specific Sound to Repel Starlings *(Sturnus vulgaris)* from Objectionable Roosts. Hubert Frings and Joseph Jumber. 1954. *Science*, **119**(3088): 318-319. An amplification of the distress call of Starlings has been very successful in clearing flocks of this species from roosts in trees and on buildings. This call seems to be quite specific, as it does not effectively repel Grackles, *Quiscalus quiscula*, or Robins, *Turdus migratorius*. The authors conclude: "much further work is needed on the habits of starlings and other pests, for this knowledge is the key to ultimate success in controlling them."—M. M. Nice.

39. Recorded Calls of Herring Gulls *(Larus argentatus)* as Repellents and Attractants. Hubert Frings, Mable Frings, Beverly Cox, Lorraine Peissner. 1955. *Science*, **121**(3140): 340-341. Herring Gulls do not have a distress call when captured, but they do have an alarm call, consisting of an attention call of 2 notes, followed by the alarm cry of 3 notes. Gulls at dumps, canneries and a fish-meal factory were driven away by broadcasts of these notes with a repeating tape player. This call was found effective for other gulls—Great Black-backed, *L. marinus*, and Laughing, *L. atricilla*. A food-finding call, recorded and played to gulls, proved to be highly attractive. "If habituation to the alarm call sets in, a shift to the attractive call, away from the area to be cleared, may give the desired result."—M. M. Nice.

40. The Daily Energy Requirements of a Wild Anna Hummingbird. Oliver P. Pearson. 1954. *The Condor*, **56**(6): 317-322. At Berkeley, California, a wild male Anna Hummingbird, *Calypte anna*, was observed to spend in flight an average of 18.7 percent of the 13 daylight hours of each of 3 and 8 September 1953. The remaining 11 hours of each day were spent at his roost. Metabolic rates of captive male Anna Hummingbirds at temperatures of 12°C and 24°C were employed to calculate (by interpolation) daily energy requirements for temperatures prevailing (ca. 18°C) on the days of observation. From 7.55 Calories (assuming torpidity at night) to 10.32 Calories (assuming sleep at night) of energy exchange are estimated for a 24-hour day of which about 13 hours are "active." Assuming sleep at night, about 33 percent of the daily energy was expended on the night roost, while if torpidity is assumed, about 9 percent of the daily energy was expended on the roost. Of daytime energy exchange (6.88 Calories), 56 percent was spent in perching, 36 percent in nectar-feeding flights, 1.3 percent in insect-catching flights, 4.5 percent in defense of feeding territory, and

the remaining 2.2 percent in miscellaneous activity. A *Fuchsia* having slightly over 1,000 blossoms provided this daily energy requirement except for insects taken on wing.—L. Richard Mewaldt.

41. The Annual Gonad and Thyroid Cycles of the English Sparrow in Southern California. John Davis and Betty Schuck Davis. 1954. *The Condor*, **56**(6): 328-345. English Sparrows, *Passer domesticus*, were collected from 3 June 1952 to 15 July 1953 at Pasadena, California. The testes of 95 males and the thyroid glands of 91 males and 64 females were examined microscopically. The ovaries and oviducts of 69 females were examined macroscopically. Testicular activity was determined by assignment to one of six stages (after Bartholomew) ranging from stage 1 with resting spermatogonia only, to stage 6 exhibiting full spermotogenic activity. The female reproductive tracts were simply indicated as inactive, with low development, or in breeding condition. Thyroid activity was evaluated by using five numbered stages of follicular epithelial development. The arithmetic mean of the stages of randomly selected cells from a thyroid gland of each bird provided an index of thyroid activity.

Testes of adult males regressed from breeding condition and reached stage 1 in late July and early August. By early October testes were in stages 2 and 3 (spermatocytes present), in which condition they remained until January. Males reached breeding condition in mid-February. Leydig cells were detected in testes in all stages. The ovaries of adult females, after regression in July and August, remained inactive until early January. Females reached breeding condition in mid-March. Breeding time at Pasadena is apparently determined by the ovarian rather than the testicular cycle. Although variation is considerable, indices to thyroid activity (similar in males and females) suggest a high in July prior to the molt and a low in April and May at the height of the breeding season. Gonadal cycles at Pasadena, when compared to findings of other investigators in Oklahoma and in Minnesota, show differences which cannot be explained solely on the basis of different day lengths. Temperature appears to be an important factor in these differences.

The authors speculate at some length on possible temperature-thyroid-pituitary-gonadal interactions. They fail to cite many pertinent works including those of E. Polikarpova, Léon Vaugien, F. H. A. Marshall, A. L. Thomson, J. W. Burger, and D. S. Farner.—L. Richard Mewaldt.

MORPHOLOGY AND ANATOMY

42. Gross Anatomy of the Wing Muscles in the Family Corvidae. George E. Hudson and Patricia J. Lanzillotti. 1955. *The American Midland Naturalist*, **53**(1): 1-44. The authors studied and describe in detail the musculature of the pectoral appendage of the Crow, *Corvus brachyrhynchos*. They were also able to dissect specimens of 18 other species of 14 genera of Corvids for comparison, in which they noted small differences that "do not suggest any taxonomic groupings."

In addition to describing (and picturing) the morphology of each muscle, they show its action and its innervation, as far as their researches permit. They point out the need for further studies on the functioning of bird muscles, preferably by means of controlled experiments, and the need for further comprehensive studies of innervation in other taxonomic groups for "comparative homologies." The work is valuable not only for its anatomical detail, but for the authors' attempt to standardize the nomenclature of the muscles, with which previous students have taken unwarranted liberties.—O. L. Austin, Jr.

FOOD HABITS

(See Number 24)

SONG

(See Numbers 25, 27, 38, 39)

BOOKS

43. The Pocket Guide to Nests and Eggs. R. S. R. Fitter. 1954. Collins Publishers, St. James's Place, London. xv—172 pp., 48 plates, 40 of them in color. Price 21 shillings. The stated purpose of this unique handbook is "to enable people to identify any nest with eggs or young that they may find in their garden, in the open country, or by the seaside, in the British Isles." It is not meant as an egg collector's guide, nor to encourage egg-collecting, which is condemned today in England as strongly as it is in this country: "The further advances to be expected from the continued indiscriminate collecting of eggs do not justify any general license to do so."

From the emphasis given to banding throughout the text, the publishers evidently expect the book to have a considerable sale among the British bird ringers. "Whereas forty or fifty years ago those bird enthusiasts who specialized in the finding and identification of nests were egg collectors almost to a man, nowadays they are nearly all bird ringers." The introduction contains a section on ringing which tells how one may take part in the British ringing scheme and gives some excellent suggestions on the technique of handling nestlings for banding, emphasizing the best times and ways to do so with least disturbance to the birds. The descriptions of the young of each species are followed by the band size it takes, and such warnings as "not to be ringed until young bird well feathered" for the waterfowl.

Several species, the Wren, the Kinglet, the Sand Martin, and the House Martin are "not to be ringed as nestlings" because they cannot be handled without destroying the nest. This makes sense, but I am at a loss to understand why the several gallinaceous game birds "may not be ringed at all." The reasons given (p. 14), "because they are not migratory, often live under artificial conditions, and are habitually shot," are anything but valid, particularly for the Quail *(Coturnix)*, about whose considerable migratory movements much too little is known. Banders are well aware that high recovery rates are obtainable only in species that "are habitually shot," and the practitioners of game management are at last beginning to realize that banding is one of their most useful and dependable research tools, invaluable for investigating all aspects of game bird biology.

The 48 plates show the females of every species (189) known to have bred in the British Isles, pictured "at its nest against its habitual background," with the egg of each, and the downy young of many of the precocial species. The text gives additional details for each species under the headings: Habitat and Range; Nest (position and construction); Eggs and Young (number in clutch, shape, color, incubation period, description of nestling, length of nestling period, ring size); Season (with number of broods).

For descriptions of each bird the reader is referred to the author's "Pocket Guide to British Birds"—which implies of course that he carries both books in his pocket. Because the book's emphasis is on "identification in the field" by "the bird watcher in the street," the author has abandoned the standard systematic order and arranged the species in a size sequence, from the smallest to the largest, under three habitat categories, land, waterside, and water. This makes for some strange companions—the Quail sandwiched in between the Pied Wagtail and the Barn Swallow for instance, and leaves the reader quite as puzzled where to look for a particular species as was the author when he tried to determine each species' habitat category. Among the land birds we find the Stork, Woodcock, Lapwing, Golden Plover, Dotterel, and Pied Wagtail; among the waterside species are the Yellow Wagtail, Sand Martin (our Bank Swallow), Rock-Dove, Marsh Harrier, Greylag Goose, and the seven British terns; among the water birds are all the gulls and ducks, the Canada and Egyptian Geese, Whooper and Mute Swans. There may be some logic to this, but I can't figure it out. Most people who may have use for the book, even the amateurs for whom it was ostensibly written, are no strangers to the standard systematic order, and all this weird sequence does

is force them to locate in the index each species they want to look up. I find this quite annoying in any bird book I have to consult regularly.

Of more use in running down an unidentified nest, egg, or nestling in the absence of the parent bird are the series of keys at the end of the book, which give convenient clues to the various species by their nesting sites, nest construction, nest materials, egg shape, egg color, and the down and gape color of altricial nestlings. The keys are cleverly done as far as they go, and worth carrying out in further detail. However, no key is provided to the downy young of precocial species, because they "can run about almost as soon as they are hatched and so can rarely provide a clue to the identity of a nest." Neither, may I add, can the size of the bird that makes it!

Unexplained is the strange omission of any reference whatever to egg size, which oologists have always used as a standard diagnostic character. Also the book might be of more use to the ringers if it listed the colors of the soft parts of the young, which are often diagnostic among otherwise similar juveniles. In a mixed tern colony, for instance, the black legs of the young Roseates and the flesh-colored legs of the young Commons make confusion between the two impossible.—O. L. Austin, Jr.

44. Bird Recognition, Volume 3. James Fisher. 1955. Penguin Books Ltd, Harmondsworth, Middlesex, England. (In the U. S., Penguin Books Inc., 3300 Clipper Road, Baltimore 11, Md.) 159 pp., 68 ill. and 71 maps. Price 85 cents. This volume covers the British pigeons and sand grouse, crakes and rails, game birds, non-passerine perching birds, and the larger passerines. The previous volumes have treated the sea birds and waders, the birds of prey, and the waterfowl. A fourth and final volume, also to be published this year, will include the smaller passerines. Possibly to stimulate sales as well as conserve space, the author refers to the first volume for an explanation of the general system, and for such introductory material as a bibliography, a key vice-county list and map, an explanation of the year-cycle charts, and a diagram of a bird's external features.

Each lefthand page treats of a species with sections on identification, breeding, distribution, and migration. Of great interest are the comments on territorial and population changes over the years. The opposite page carries a picture of the bird in black and white with scale indicated, a map of the British Isles showing its distribution, and an ingenious circular chart reminiscent of a compass rose, within which on a series of progressively smaller circles denoting the seasons, the months, and the weeks, pertinent data on such features as song period, egg dates, young, and migration are spaced according to the times they occur.

Price limitations restrict the size of a volume of this type, and the omission of 37 "Extreme Rarities" is understandable. When, however, these "Rarities" include species such as *Lanius senator* with 82 records, *Nucifraga caryocatactes* with 70, and nine other species recorded more than 10 times each, the value of the book becomes somewhat restricted for advanced use. It is, further, unfortunate that economics of price and color plates do not harmonize. Nevertheless, within the limitations imposed by price, this pocket-sized book contains an almost incredible amount of information on the life and habits of British birds, presented in a manner interesting to the beginner and with a scientific accuracy that warrants its use by the expert.—Wendell Taber.

45. Travels of William Bartram. Edited by Mark Van Doren. 1955. Dover Publications, Inc., 1780 Broadway, N. Y. 19, N. Y. pp. 1-414, ill. Price $3.95 cloth, $1.95 paper. An unabridged reprint of this rare classic, first published in 1791 under the title: "Travels through North and South Carolina, Georgia, East & West Florida, the Cherokee Country, the Extensive Territories of the Muscogulges, or Creek Confederacy, and the Country of the Chactaws; Containing an Account of the Soil and Natural Productions of those Regions, together with Observations on the Manners of the Indians."

This is an excellent book for the ornithologist's bedside table, to be picked up and browsed in at random. Though primarily a botanist, Bartram was a well-rounded naturalist, keenly interested in all living things, and he had a nice gift for description. I find particularly intriguing his casual, matter-of-fact, yet accurate and ample comments on the wildlife he encountered. It is hard to believe how

abundant, only 175 years ago, were the birds we know only as rarities today. And a bit shocking and sobering.—O. L. Austin, Jr.

NOTES AND NEWS

In connection with studies on the phenomenon of sudden death, Dr. Curt P. Richter of the Johns Hopkins Hospital, Baltimore 5, Maryland, would like to receive specimens of birds that die during the banding process provided they are in reasonably good condition. Such specimens could be sent to him in dry ice.

Oliver L. Austin, Jr., *Bird-Banding's* Review Editor, is now on his way to the Antarctic, as Air Force observer on Operation Deepfreeze, with May 1, 1956 the probable date of return. Meanwhile, we are fortunate in having the help of Dr. Donald S. Farner (Laboratories of Zoophysiology, State College of Washington, Pullman, Wash.), who handled the review section for more than nine years, down to 1952. Correspondence on reviews should be directed to Dr. Farner, as should publications for review *except* regular exchanges and books from publishers who include *Bird-Banding* on their regular review lists. It is simpler for us to forward such exchanges and books than to attempt to use a new address for a relatively short period.

BIRD-BANDING

A JOURNAL OF ORNITHOLOGICAL INVESTIGATION

Published quarterly for:

THE NORTHEASTERN BIRD-BANDING ASSOCIATION
THE EASTERN BIRD-BANDING ASSOCIATION
THE INLAND BIRD-BANDING ASSOCIATION

Applications for membership in these associations should be sent to their respective secretaries. The annual membership dues of $5 per year in the Northeastern Association include a subscription to *Bird-Banding*. Membership in the Eastern and Inland Associations is $2 each per year; members of those associations who wish to receive *Bird-Banding* may send $1 direct to the secretary-treasurer. Subscription price to non-members of the associations is $5 per year; single copies $1.25.

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